

# EXHIBIT M

**SUPPLEMENTAL REPORT OF ORLEY ASHENFELTER**

**IN CONNECTION WITH**

*Amy Cohen, et al. v. Brown University, et al.*

**Case Number 92-CV-0197**

**August 17, 2020**

## I. ASSIGNMENT

1. On August 7, 2020, I filed a report in connection with this case.<sup>1</sup> Counsel for Brown University, Christina Paxson, and Jack Hayes (“Brown University”) have asked me to tabulate certain data and answer certain additional questions. More specifically, counsel for Brown University have asked me:

- To tabulate the roster sizes and how they changed for each team, organized by season and gender, between the official 2019-2020 participation report, submitted as part of Brown’s Annual Report under the Joint Agreement in this case (“2019-2020 Participation Report”), and the Pre-Season Official Athletics Rosters<sup>2</sup> for 2020-2021.
- How have the roster sizes for each team varied from year to year, from the 1998-1999 academic year to the present?
- How have the roster sizes for each team varied from the first day of competition to the last day of competition, from the 1998-1999 academic year to the present?

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<sup>1</sup> Report of Orley Ashenfelter, August 7, 2020, in connection with *Amy Cohen, et al. v. Brown University, et al.*, Case No. 92-cv-0197 (“My original report”).

<sup>2</sup> All capitalized terms are given the same meaning herein as in my original report.

- For the 2018-2019 and 2019-2020 years, how do roster sizes for each team vary from the Pre-Season Official Athletics Rosters, as signed or certified by their coaches on their roster declaration forms, to the (a) team rosters on the first day of competition; (b) last day of competition, and (c) average team rosters for the season (as reported in Brown's Annual Reports)?

2. This report summarizes the results of these additional findings to date.

Appendix A lists the documents, databases, and other sources I have relied on in the course of my analysis. I reserve the right to supplement this report as appropriate, including to account for any new data or information that becomes available.

## **II. SUMMARY OF CONCLUSIONS**

3. I reach the following conclusions:

- I have tabulated the data from the 2019-2020 Participation Report and the 2020-2021 Pre-Season Official Athletics Roster, as well as the changes between these two Rosters, and presented these data in Table 1.
- I find that while the size of each team can and does fluctuate over time, each team's roster size is generally fairly stable from year to year, typically only changing by a few participants between years.
- I find that between the 1998-1999 and 2019-2020 academic years, for both men's and women's varsity athletic opportunities, more than two-thirds of all

team-years either have the same roster size or are within one person (plus or minus) on the last day of competition as they had on the first. In other words, I find that men's and women's varsity athletic opportunities for each team are generally stable from the first day of competition to the last day of competition of each academic year.

- I find that the number of varsity athletic opportunities on the Pre-Season Official Athletics Rosters from 2018-2019 and 2019-2020 are good predictors, for each team, of the number of varsity athletic opportunities : a) on the first day of competition; (b) on the last day of competition, and (c) the average of these two figures.

### **III. DATA AND ANALYSIS**

#### **A. Data**

4. In order to answer the questions listed in Section II above, I have used the following data sources:

- Participation Reports from academic years 1998-1999 through 2019-2020, submitted as part of the Annual Reports Brown is required to submit under the Joint Agreement ("Participation Reports").<sup>3</sup> These data include,

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<sup>3</sup> BROWN2020\_00000795 and 796; BROWN2020\_00000966 and 967; BROWN2020\_00001088 and 1089; BROWN2020\_00001251 and 1252; BROWN2020\_00001402 and 1403; BROWN2020\_00001493 and 1494; BROWN2020\_00001640 and 1641; BROWN2020\_00001742 and 1743; BROWN2020\_00001848 and 1849;

separately for men's and women's varsity athletic opportunities, the number of male and female varsity athletic opportunities on each team's roster as of (1) the first day of competition; (2) the last day of competition; and (3) the average of these two numbers.

- Pre-season “Official Athletics Rosters” from the 2018-2019 through 2020-2021 academic years.<sup>4</sup> Each team’s coach sets forth their rosters on “roster

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BROWN2020\_00001960 and 1961; BROWN2020\_00002068 and 2069; BROWN2020\_00002354 and 2355; BROWN2020\_00002533 and 2534; BROWN2020\_00002536 and 2537; BROWN2020\_00002771 and 2772; BROWN2020\_00002892 and 2893; BROWN2020\_00002895 and 2897; BROWN2020\_00003022 and 3023; BROWN2020\_00003620 and 3621; BROWN2020\_00003384 and 3385; BROWN2020\_00003387 and 3388; BROWN2020\_00000081 and 82.

<sup>4</sup> **2018-2019 Pre-Season Official Athletics Roster:** BROWN2020\_00003541; BROWN2020\_00003543; BROWN2020\_00003545; BROWN2020\_00003547; BROWN2020\_00003549; BROWN2020\_00003551 and BROWN2020\_00003407; BROWN2020\_00003551 and BROWN2020\_00003409; BROWN2020\_00003553; BROWN2020\_00003555 and -56; BROWN2020\_00003558; BROWN2020\_00003559; BROWN2020\_00003561; BROWN2020\_00003563; BROWN2020\_00003565; BROWN2020\_00003567 and -68; BROWN2020\_00003569 and -70; BROWN2020\_00003572 and -73 ; BROWN2020\_00003575 and -76 ; BROWN2020\_00003578; BROWN2020\_00003579; BROWN2020\_00003581; BROWN2020\_00003583; BROWN2020\_00003584 and -85; BROWN2020\_00003586 and -87; BROWN2020\_00003588; BROWN2020\_00003590; BROWN2020\_00003591; BROWN2020\_00003592; BROWN2020\_00003594; BROWN2020\_00003596; BROWN2020\_00003598; BROWN2020\_00003600; BROWN2020\_00003603; BROWN2020\_00003605 and -06.

**2019-2020 Pre-Season Official Athletics Roster:** BROWN2020\_00000002 and 03; BROWN2020\_00000005; BROWN2020\_00000006; BROWN2020\_00000008; BROWN2020\_00000009; BROWN2020\_00000011; BROWN2020\_00000013; BROWN2020\_00000015; BROWN2020\_00000018; BROWN2020\_00000020 and 23; BROWN2020\_00000024; BROWN2020\_00000026; BROWN2020\_00000027; BROWN2020\_00000030; BROWN2020\_00000032; BROWN2020\_00000034 and 35; BROWN2020\_00000037 and 38; BROWN2020\_00000040 and 41; BROWN2020\_00000042 and 43; BROWN2020\_00000047; BROWN2020\_00000048 and 49; BROWN2020\_00000052; BROWN2020\_00000054; BROWN2020\_00000055; BROWN2020\_00000057; BROWN2020\_00000059; BROWN2020\_00000061 and 62; BROWN2020\_00000063; BROWN2020\_00000065; BROWN2020\_00000067; BROWN2020\_00000069 and 70; BROWN2020\_00000071 and 72; BROWN2020\_00000073; BROWN2020\_00000076; BROWN2020\_00000077 and 78; BROWN2020\_00000080.

**2020-2021 Pre-Season Official Athletics Roster:** BROWN2020\_00000357 and 358; BROWN2020\_00000360; and 361; BROWN2020\_00000363; BROWN2020\_00000366; BROWN2020\_00000369 and 370; BROWN2020\_00000372; BROWN2020\_00000375 and 376;

declaration forms,” which are then signed or certified by each during the summer before the relevant academic year starts. These Official Athletics Rosters include each player the coach expects to play on each team for each year on the first day of competition. In other words, “[w]hen completed and signed by the Head Coach, th[ese] form[s] . . . serve as the initial roster reported at the beginning of each academic year.”<sup>5</sup>

5. I have also used information indicating which teams play sports in which seasons. I will refer to a season-gender combination simply as a “season.” Sports at Brown University are played in six such seasons: Women’s Fall; Women’s Winter; Women’s Spring; Men’s Fall; Men’s Winter; and Men’s Spring. The teams that play in each season are as follows:

- Women’s Fall: Cross Country, Field Hockey, Rugby, Soccer, Volleyball, and Sailing.<sup>6</sup>

BROWN2020\_00000378 and 379; BROWN2020\_00000381; BROWN2020\_00000384; BROWN2020\_00000387 and 388; BROWN2020\_00000390; BROWN2020\_00000393 and 394; BROWN2020\_00000396 and 397; BROWN2020\_00000399 and 400; BROWN2020\_00000402; BROWN2020\_00000405; BROWN2020\_00000408 and 409; BROWN2020\_00000411 and 412; BROWN2020\_00000414; BROWN2020\_00000417 and 418; BROWN2020\_00000420; BROWN2020\_00000423; BROWN2020\_00000426 and 428; BROWN2020\_00000430; BROWN2020\_00000430 and 431; BROWN2020\_00000433 and 434; BROWN2020\_00000435 and 436; BROWN2020\_00000438 and 439; BROWN2020\_00000441 and 442; BROWN2020\_00000444 and 445; BROWN2020\_00000447 and 448; BROWN2020\_00000790 and 791.

<sup>5</sup> E.g., BROWN2020\_00003543; BROWN2020\_00000002; BROWN2020\_00000447.

<sup>6</sup> Women’s and Co-ed Sailing are Fall and Spring sports. For the purposes of assigning a season, I consider them Spring Sports because the final competitive event occurs in the Spring.

- Women's Spring: Crew, Equestrian,<sup>7</sup> Golf,<sup>8</sup> Lacrosse, Softball, Tennis, and Track and Field.<sup>9</sup>
- Women's Winter: Basketball, Fencing, Gymnastics, Ice Hockey, Skiing, Squash, and Swimming and Diving.
- Men's Fall: Cross Country, Football, Soccer, Water Polo, and Sailing.
- Men's Spring: Baseball, Crew, Equestrian,<sup>10</sup> Golf, Lacrosse, Tennis, and Track and Field.
- Men's Winter: Basketball, Fencing, Ice Hockey, Skiing, Squash, Swimming and Diving, and Wrestling.

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<sup>7</sup> Equestrian competitions occur throughout the academic year, but I consider it a Spring sport for organizational purposes because the final competitive event occurs in the Spring. See <https://brownbears.com/sports/equestrian/schedule/2019-20> for the 2019-2020 Equestrian schedule (the 2020-2021 schedule has not been released). Accessed August 14, 2020.

<sup>8</sup> Men's and women's Golf competitions occur throughout the academic year, but I consider it a Spring sport for organizational purposes because the final competitive event occurs in the Spring. See <http://www.ncaa.org/championships/statistics>. Accessed August 14, 2020.

<sup>9</sup> Men's and Women's Indoor Track and Field (Winter) and Outdoor Track and Field (Spring) are considered one sport for the purposes of the Joint Agreement. For the purposes of assigning a season, I consider it a Spring sport.

<sup>10</sup> There is one record of a male athlete participating in Equestrian at Brown University since the 1998-1999 academic year.

6. Several of Brown's varsity athletic teams are co-ed, or occasionally have women on the men's team.<sup>11</sup> In the event of a mixed-gender team, I record male athletes as participating in male varsity athletic opportunities, and female athletes as participating in female varsity athletic opportunities.<sup>12</sup>

B. Analysis

7. My first analysis examines how the roster data changed for each team between the 2019-2020 Participation Report and the 2020-2021 Official Athletics Rosters. There were a total of 446.5 male and 447.5 female varsity athletic opportunities in the 2019-2020 Participation Report and 450.5 male and 488 female varsity athletic opportunities in the 2020-2021 Official Athletics Roster.

8. The results of this analysis are summarized in Table 1. Table 1 lists for each team, each Season combination, and for each gender: (a) the total number of varsity athletic opportunities reflected in the 2019-2020 Participant Report Roster (Column 1); (b) the total number of varsity athletic opportunities reflected in the 2020-2021 Pre-Season Official Athletics Roster (Column 2); and (c) the numerical difference between these rosters (subtracting the 2019-2020 Participation Report from the 2020-2021 Official Athletics

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<sup>11</sup> The following teams have at least one year where both male and female athletes are recorded in the data as being on the same team: Crew, Equestrian, and Sailing.

<sup>12</sup> I identified female members of the men's crew team in the 2018-2019 and 2019-2020 Official Pre-Season Rosters from BROWN2020\_00003433-45 and BROWN2020\_0000179-183. The 2018-2019 Official Pre-Season Roster included a single roster for fencing. I identified each athlete's gender in this file from BROWN2020\_00003407-3410.

Roster) (Column 3). Note that Men's Golf, Fencing and Squash, and Women's Equestrian, Golf, Fencing, Skiing and Squash teams existed in 2019-2020 but do not exist in 2020-2021, while Women's and Co-Ed Sailing exist in 2020-2021 but did not exist in 2019-2020.

9. Figures 1A through 1C represent these data graphically. Figure 1A presents a comparison of the 2019-2020 Participation Report and 2020-2021 Official Athletics Roster for men's teams. Figure 1B presents a parallel analysis for women's teams. Each sport has a pair of bars.<sup>13</sup> The first bar in each pair represents the number of athletes on the 2019-2020 Participation Report.<sup>14</sup> The second bar in each pair represents the number of athletes on the 2020-2021 Pre-Season Official Athletics Roster. If the second bar is taller than the first, it indicates the 2020-2021 Pre-Season Official Athletics Roster is larger than the same sport's roster from the 2019-2020 Participation Report. The number on top of each pair of bars indicates the amount by which the team's roster is larger (if the number is positive) or smaller (if the number is negative) in the 2020-2021 Pre-Season Official Athletics Roster than the 2019-2020 Participation Report. Table 1C presents a comparison of the total number of varsity athletic opportunities by gender between the 2019-2020 Participation Report and the 2020-2021 Pre-Season Official Roster. As with Tables 1A and 1B, the number above each pair of bars indicates how much larger the 2020-2021 Pre-Season Official Roster is than the 2019-2020 Participation Report. The first pair of bars presents

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<sup>13</sup> Note that sports that were added or eliminated for the 2020-2021 academic year have only one bar.

<sup>14</sup> For the 2019-2020 Participation Report column, I have reported the average of the rosters on the first and last day of competition, which I understand is the metric of interest in the Joint Agreement.

this information for men's varsity athletic opportunities. The second pair of bars presents this information for women's varsity athletic opportunities, counting Women's and Co-Ed Sailing as separate opportunities. The third pair of bars presents this information for women's varsity athletic opportunities, counting Women's and Co-Ed Sailing as a single opportunity.

10. Table 2 presents the summary of an analysis where I compare the roster size from year to year for each sport. Because of the size of this chart, I have presented it across two pages for ease of readability. The first page contains information for years 1998-1999 through 2008-2009; the second page contains information on the years 2009-2010 through 2019-2020.<sup>15</sup> Each column lists the average number of varsity athletic opportunities for each sport in each year since the beginning of the Joint Agreement. As with Table 1, they are arranged by gender and season, and figures are presented for each year at the (a) team, (b) season, and (c) gender level.

11. Figures 2A through 2J represent these data graphically. Each Figure depicts the size of each team's roster on an annual basis from the 1998-1999 academic year through the 2019-2020 academic year. Each Season is presented on its own page, with Seasons with more than 5 teams further subdivided for readability. More specifically:

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<sup>15</sup> As in my original report, I have excluded 2000-2001 from this analysis due to the fact that, as I understand it, uncertainty existed about how varsity athletic opportunities were to be counted in this year.

- Figure 2A presents the average roster sizes for each Men's Fall sport: Cross Country, Football, Soccer, and Water Polo.
- Figure 2B presents the average roster sizes for the following Men's Spring sports: Baseball, Crew, and Golf.
- Figure 2C presents the average roster sizes for the following Men's Spring sports: Lacrosse, Tennis, and Track.
- Figure 2D presents the average roster sizes for the following Men's Winter sports: Basketball, Fencing, and Ice Hockey.
- Figure 2E presents the average roster sizes for the following Men's Winter sports: Squash, Swimming and Diving, and Wrestling.
- Figure 2F presents the average roster sizes for each Women's Fall sport: Cross Country, Field Hockey, Rugby, Soccer, and Volleyball.
- Figure 2G presents the average roster sizes for the following Women's Spring sports: Crew, Equestrian, Golf, and Lacrosse.
- Figure 2H presents the average roster sizes for the following Women's Spring sports: Softball, Tennis, Track, and Water Polo.
- Figure 2I presents the average roster sizes for the following Women's Winter sports: Basketball, Fencing, Gymnastics, and Ice Hockey.

- Figure 2J presents the average roster sizes for the following Women's Winter sports: Skiing, Squash, and Swimming and Diving.

12. Table 3 summarizes my analysis of how the number of varsity athletic opportunities varies over the course of a year. For each sport and for academic year from 1998-1999 through 2019-2020,<sup>16</sup> this table presents the number of varsity athletic opportunities for each team as of (1) the first date of competition, (2) the final date of competition, and (3) the difference between these two values. These are also reported for each season and for each gender. As with Table 2, because of the size of this table, I present this information on six pages. Tables 3A through 3C present this information for Men's Fall, Spring, and Winter, respectively. Tables 3D through 3F present this information for Women's Fall, Spring, and Winter, respectively.

13. Figures 3A and 3B present these data graphically. Figure 3A presents a histogram of the change in each men's team's roster from the first athletic competition to the final athletic competition of each year. Each bar represents an observed roster change. The height of each bar represents what proportion of team-years experienced a roster change of that size. The tallest bar is at 0, indicating that the most common outcome is that teams have the same number of players on their rosters on the last day of competition as they did on the first day of competition. I find that approximately 38% of men's team-years have the same roster size on the final day of competition as they did on the first. Each bar to the left

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<sup>16</sup> I have omitted 2000-2001 from this table. See fn 15 above.

of 0 indicates that a team-year had a smaller roster as of the last competition than it had on the first day of competition. Each bar to the right of 0 indicates team-year had a larger roster as of the last competition than it had on the first day of competition. I find that more than two-thirds of all men's team-years either have the same roster size or are within one person (plus or minus) on the last day of competition as the number they had on the first.

14. Figure 3B is parallel to Figure 3A and presents information on the stability of roster sizes for women's teams. As with the men's teams, the most common outcome is that teams have the same number of players on their rosters on the last day of competition as they did on the first day of competition. I find that approximately 44% of women's team-years have the same roster size on the last day of competition as they did on the first. Each bar to the left of 0 indicates that a team-year had a smaller roster as of the final competition than it had on the first day of competition. Each bar to the right of 0 indicates team-year had a larger roster as of the last competition than it had on the first day of competition. I find that more than two-thirds of all women's team-years either have the same roster size or are within one person (plus or minus) on the last day of competition as the number they had on the first.

15. Table 4 presents the summary of an analysis where I compare the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster (which is reported during the summer preceding each academic year) with the (a) the roster on the first day of competition; (b) the roster on the final day of competition; and (c) the average of these two values, all of which are reported on the 2018-2019 Participation Report in Brown's Annual Report. This is reported for each team, season, and gender.

16. Figures 4A through 4F are based on the roster changes reported in Table 4. Figure 4A presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition, separately for each men's team. The distance of the bar from the horizontal line at zero indicates how much smaller (if the bar falls below zero) or larger (if the bar rises above zero) each team's roster is as of the first day of competition relative to the Pre-Season Official Athletics Roster. Sports that do not have a visible bar (e.g., Golf) have the same size roster at both points in time. These graphs present the following information, and can each be read in a parallel fashion.

- Figure 4A (Men) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 4B (Men) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 4C (Men) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities for the year.

- Figure 4D (Women) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 4E (Women) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 4F (Women) presents the difference between the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities for the year.

17. Figures 4G through 4L present the information from Table 4 in a different way.

Figure 4G is a scatterplot of each team's number of varsity athletic opportunities as of the first day of competition (presented on the vertical axis) and that team's number of varsity athletic opportunities according to the pre-season Official Athletics Roster (presented on the horizontal axis). The "fitted values" line is the result of a regression of each team's roster

size as of the first day of competition on that team's pre-season roster.<sup>17</sup> These graphs present the following information, and can each be read in a parallel fashion.

- Figure 4G (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 4H (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 4I (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities on the first and last days of competition.

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<sup>17</sup> The coefficient on the pre-season variable and the R-squared value for the regression are included in the notes to each figure. The pre-season coefficient indicates how much the number of varsity athletic opportunities on the first day increases for each additional varsity athletic opportunity on the pre-season roster. R-squared is a measure that represents the proportion of the variance in the number of varsity athletic opportunities on the first day of competition (or, in other versions, the last day of competition or the average of these two numbers) that is explained by the number of varsity athletic opportunities in the pre-season roster. An R-squared value of "1" would mean that the x-axis variable (Pre-season Official Athletics Roster) completely explains the y-axis variable (the first day of competition, the last day of competition, or the average of these two numbers). Here, for all analyses, the R-squared values range from .91 to .99, indicating that the number of varsity athletic opportunities in the Official Athletics Rosters explain between 91% and 99% of the variation in men's and women's varsity athletic opportunities on the first day of competition, the last day of competition, or the average of these two numbers, depending on the y-axis variable in question.

- Figure 4J (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 4K (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 4L (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2018-2019 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities on the first and last days of competition.

18. For both men and women, the number of varsity athletic opportunities on the 2018-2019 Pre-season Official Athletics Roster serves as a reliable predictor for (a) the varsity athletic opportunities on the first day of competition; (b) the varsity athletic opportunities on the final day of competition; and (c) the average of these two values.

19. Table 5 presents the summary of an analysis where I compare the number of varsity athletic opportunities in the 2019-2020 Pre-season Official Athletics Roster (which is reported during the summer preceding each academic year) with the (a) the roster on the first day of competition; (b) the roster on the final day of competition; and (c) the average of these two values, all of which are reported on the 2019-2020 Participation Report in Brown's Annual Report. This is reported for each team, season, and gender.

20. Figures 5A through 5F are based on the roster changes reported in Table 5. Figure 5A presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition, separately for each men's team. The distance of the bar from the horizontal line at zero indicates how much smaller (if the bar falls below zero) or larger (if the bar rises above zero) each team's roster is as of the first day of competition relative to the Pre-Season Official Athletics Roster. Sports that do not have a visible bar (e.g., Cross Country) have the same size roster at both points in time. These graphs present the following information, and can each be read in a parallel fashion.

- Figure 5A (Men) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 5B (Men) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 5C (Men) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster

and the average number of varsity athletic opportunities on the first and last days of competition.

- Figure 5D (Women) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 5E (Women) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 5F (Women) presents the difference between the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities on the first and last days of competition.

21. Figures 5G through 5L present the information from Table 5 in a different way.

Figure 5G is a scatterplot of the size of each team's number of varsity athletic opportunities as of the first day of competition (presented on the vertical axis) and that team's number of varsity athletic opportunities according to the pre-season Official Athletics Roster (presented on the horizontal axis). The “fitted values” line is the result of a regression of each team’s

roster size as of the first day of competition on that team's pre-season roster.<sup>18</sup> These graphs present the following information, and can each be read in a parallel fashion.

- Figure 5G (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.
- Figure 5H (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 5I (Men) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities for the year.
- Figure 5J (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the first day of competition.

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<sup>18</sup> The coefficient on the pre-season variable and the R-squared value for the regression are included in the notes to each figure.

- Figure 5K (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the number of varsity athletic opportunities on the last day of competition.
- Figure 5L (Women) presents a scatterplot of the number of varsity athletic opportunities in the 2019-2020 Pre-Season Official Athletics Roster and the average number of varsity athletic opportunities for the year.

22. For both men and women, the number of varsity athletic opportunities on the 2019-2020 Pre-season Official Athletics Roster serves as a reliable predictor for the (a) the number of varsity athletic opportunities on the first day of competition; (b) the number of varsity athletic opportunities on the final day of competition; and (c) the average of these two values.

#### **IV. CONCLUSIONS**

23. I reach the following conclusions:

- I have tabulated the data from the 2019-2020 Participation Report and the 2020-2021 Pre-Season Official Athletics Roster as well as the changes between these two Rosters and presented these data in Table 1.
- I find that while the size of each team can and does fluctuate over time, each team's roster size is generally fairly stable from year to year, typically only changing by a few participants between years.

- I find that between the 1998-1999 and 2019-2020 academic years, for both men's and women's varsity athletic opportunities, more than two-thirds of all team-years either have the same roster size or are within one person (plus or minus) on the last day of competition as they had on the first. In other words, team roster sizes are relatively stable over the course of an academic year.
- I find that the number of varsity athletic opportunities on the Pre-Season Official Athletics Rosters from 2018-2019 and 2019-2020 explain between 91% and 99% of the variance in the number of varsity athletic opportunities:
  - (a) on the first day of competition; (b) on the last day of competition, and (c) the average of these two figures. I conclude that the Pre-Season Official Athletics Rosters from 2018-2019 and 2019-2020 are reliable indicators of the number of varsity athletic opportunities (a) on the first day of competition; (b) on the last day of competition, and (c) the average of these two figures.



Orley Ashenfelter

August 17, 2020

Table 1  
Comparing 2019-2020 and 2020-2021 Rosters

		2019-20 Participation Report Roster (Average)	2020-21 Pre- Season Official Athletics Roster	Change From 2019-20 to 2020-2021
Men's Fall	Cross Country	15	12	-3
	Football	88.5	99	10.5
	Sailing (coed)	---	10	10
	Soccer	25.5	30	4.5
	Water Polo	20	19	-1
	Season Total	149	170	21
Men's Spring	Baseball	29.5	27	-2.5
	Crew	36	46	10
	Golf	8	---	-8
	Lacrosse	48	51	3
	Tennis	11	10	-1
	Track	45	41.5	-3.5
	Season Total	177.5	175.5	-2
Men's Winter	Basketball	14	18	4
	Fencing	11	---	-11
	Ice Hockey	29.5	30	0.5
	Squash	15	---	-15
	Swimming	28	29	1
	Wrestling	22.5	28	5.5
	Season Total	120	105	-15
Men	Men's Total	446.5	450.5	4
Women's Fall	Cross Country	19	27	8
	Field Hockey	23.5	25	1.5
	Rugby	34	33	-1
	Sailing (coed)	---	24	24
	Sailing (women's)	---	24	24
	Soccer	27	32	5
	Volleyball	19.5	21	1.5
	Season Total	123	186	63
Women's Spring	Crew	49	53	4
	Equestrian	23.5	---	-23.5
	Golf	9	---	-9
	Lacrosse	30	36	6
	Softball	18	23	5
	Tennis	8	12	4
	Track	43	58	15
	Water Polo	23	23	0
	Season Total	203.5	205	1.5
Women's Winter	Basketball	13.5	15	1.5
	Fencing	12	---	-12
	Gymnastics	15	22	7
	Ice Hockey	18.5	23	4.5
	Skiing	10	---	-10
	Squash	14	---	-14
	Swimming	38	37	-1
	Season Total	121	97	-24
Women	Women's Total	447.5	488	40.5

Table 2A

## Roster Size of Each Team from Year to Year: 1998-1999 through 2008-2009

Team	1998-1999	1999-2000	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	
Men's Fall	Cross-Country	19.5	20	18	19.5	17	19	17.5	22	20	26
	Football	85	102	95	93.5	83.5	90.5	94.5	93.5	91	106
	Soccer	22.5	27	24	23	23.5	24.5	24	24	25	24.5
	Water Polo	16	15.5	14	11	16	13.5	13.5	12	12	15.5
	Season Total	143	164.5	151	147	140	147.5	149.5	151.5	148	172
Men's Spring	Baseball	26	24	23.5	23	25	28.5	24.5	26	25.5	24
	Crew	37	49	44	39	45	44.5	33	43.5	42	45.5
	Equestrian	1	--	--	--	--	--	--	--	--	--
	Golf	8.5	8.5	9.5	9.5	10	10	9.5	9	6.5	6
	Lacrosse	37.5	38.5	38.5	36	35	37	35.5	33	38	37.5
	Tennis	9.5	8.5	10	10	10	9	10	9	10	10
	Track	45.5	54	48	48	49.5	56	47.5	51.5	47	40
	Season Total	165	182.5	173.5	165.5	174.5	185	160	172	169	163
Men's Winter	Basketball	16	14.5	15	14.5	12	14.5	12.5	11	14.5	13
	Fencing	14	13	14	15	14.5	14.5	15	15	14	15
	Ice Hockey	27	26	28	30	26	27.5	27	25.5	24	28
	Squash	10.5	12.5	9	10	10	11	11	11.5	12	11
	Swimming	21	17	16	16	18	19.5	22	24	23	22
	Wrestling	24.5	24.5	20.5	25	24.5	22	22.5	21.5	26.5	26
	Season Total	113	107.5	102.5	110.5	105	109	110	108.5	114	115
Men	Men's Total	421	454.5	427	423	419.5	441.5	419.5	432	431	450
Women's Fall	Cross-Country	26	26.5	21	24	25	26.5	22	24	29	33
	Field Hockey	24.5	32	25	22	27	24	24	20	22.5	23.5
	Rugby	--	--	--	--	--	--	--	--	--	--
	Soccer	31	49	22	28	27	23.5	25	27	31.5	29.5
	Volleyball	23	21	14	18	16	14.5	16.5	18	17	17
	Season Total	104.5	128.5	82	92	95	88.5	87.5	89	100	103
Women's Spring	Crew	71.5	71	52	55	51	48.5	56.5	53	46	52.5
	Equestrian	32	36	33.5	35	36.5	33	32.5	33.5	32	28
	Golf	8.5	9.5	10	9	7	6	7.5	7	6.5	8
	Lacrosse	29.5	26.5	30	29.5	32.5	28.5	27	26	28.5	32
	Softball	17	16	15.5	15.5	19.5	17	17.5	16	14.5	16.5
	Tennis	8.5	9	11.5	11	8	8	10.5	10.5	10.5	15.5
	Track	51.5	55.5	50	56	63.5	52.5	50.5	50	50.5	47
	Water Polo	14	12.5	18	21	18	15.5	13.5	14	11.5	13
	Season Total	232.5	236	220.5	232	236	209	215.5	210	200	212.5
Women's Winter	Basketball	16	13.5	12	14	18	15	15.5	15	16	15.5
	Fencing	27.5	22	13	23.5	21	21	21.5	15.5	15.5	16.5
	Gymnastics	18	18	13.5	17	17.5	14	15	10	12.5	15
	Ice Hockey	18.5	24	22.5	26.5	26	23.5	22	21	22	26
	Skiing	10	13	10.5	14	13	13	13	12	10.5	8
	Squash	17	18.5	16	16.5	17	14	16	15	15	12.5
	Swimming	25.5	25.5	23	24.5	33	30.5	33	28	23	28
	Season Total	132.5	134.5	110.5	136	145.5	131	136	116.5	114.5	121.5
Women	Women's Total	469.5	499	413	460	476.5	428.5	439	415.5	414.5	437

<sup>†</sup> Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 2.

**Table 2B**

Table 3A: Men's Fall  
Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

	Roster	Cross-Country	Football	Soccer	Water Polo	Season Total	Men's Total
1998-1999	1st Competition	20	85	22	16	143	428
	Last Competition	19	85	23	16	143	414
	Change (N)	-1	0	1	0	0	-14
1999-2000	1st Competition	20	103	27	16	166	465
	Last Competition	20	101	27	15	163	444
	Change (N)	0	-2	0	-1	-3	-21
2001-2002	1st Competition	18	98	25	15	156	434
	Last Competition	18	92	23	13	146	420
	Change (N)	0	-6	-2	-2	-10	-14
2002-2003	1st Competition	19	100	24	11	154	435
	Last Competition	20	87	22	11	140	411
	Change (N)	1	-13	-2	0	-14	-24
2003-2004	1st Competition	17	84	23	16	140	420
	Last Competition	17	83	24	16	140	419
	Change (N)	0	-1	1	0	0	-1
2004-2005	1st Competition	19	92	25	14	150	454
	Last Competition	19	89	24	13	145	429
	Change (N)	0	-3	-1	-1	-5	-25
2005-2006	1st Competition	18	94	24	14	150	426
	Last Competition	17	95	24	13	149	413
	Change (N)	-1	1	0	-1	-1	-13
2006-2007	1st Competition	22	96	26	12	156	439
	Last Competition	22	91	22	12	147	425
	Change (N)	0	-5	-4	0	-9	-14
2007-2008	1st Competition	20	90	25	13	148	432
	Last Competition	20	92	25	11	148	430
	Change (N)	0	2	0	-2	0	-2
2008-2009	1st Competition	27	108	25	16	176	461
	Last Competition	25	104	24	15	168	439
	Change (N)	-2	-4	-1	-1	-8	-22
2009-2010	1st Competition	27	100	26	15	168	467
	Last Competition	27	96	26	15	164	453
	Change (N)	0	-4	0	0	-4	-14
2010-2011	1st Competition	19	93	23	17	152	436
	Last Competition	19	97	23	17	156	428
	Change (N)	0	4	0	0	4	-8
2011-2012	1st Competition	20	112	24	14	170	463
	Last Competition	20	106	23	14	163	437
	Change (N)	0	-6	-1	0	-7	-26
2012-2013	1st Competition	19	110	24	17	170	470
	Last Competition	19	95	24	17	155	441
	Change (N)	0	-15	0	0	-15	-29
2013-2014	1st Competition	20	108	25	16	169	473
	Last Competition	19	101	24	17	161	449
	Change (N)	-1	-7	-1	1	-8	-24
2014-2015	1st Competition	21	108	26	16	171	475
	Last Competition	16	101	27	16	160	450
	Change (N)	-5	-7	1	0	-11	-25
2015-2016	1st Competition	17	101	28	18	164	466
	Last Competition	10	100	28	18	156	451
	Change (N)	-7	-1	0	0	-8	-15
2016-2017	1st Competition	21	106	26	19	172	479
	Last Competition	22	107	26	21	176	477
	Change (N)	1	1	0	2	4	-2
2017-2018	1st Competition	21	114	27	22	184	489
	Last Competition	17	113	26	21	177	476
	Change (N)	-4	-1	-1	-1	-7	-13
2018-2019	1st Competition	17	91	26	19	153	454
	Last Competition	17	89	26	19	151	441
	Change (N)	0	-2	0	0	-2	-13
2019-2020	1st Competition	15	88	26	20	149	446
	Last Competition	15	89	25	20	149	447
	Change (N)	0	1	-1	0	0	1

<sup>†</sup> Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 3B: Men's Spring

Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

Roster	Baseball	Crew	Equestrian	Golf	Lacrosse	Tennis	Track	Season Total	Men's Total	
1998-1999	1st Competition	26	39	1	9	38	10	47	170	428
	Last Competition	26	35	1	8	37	9	44	160	414
	Change (N)	0	-4	0	-1	-1	-1	-3	-10	-14
1999-2000	1st Competition	24	53	---	9	39	9	54	188	465
	Last Competition	24	45	---	8	38	8	54	177	444
	Change (N)	0	-8	---	-1	-1	-1	0	-11	-21
2001-2002	1st Competition	23	47	---	10	39	10	48	177	434
	Last Competition	24	41	---	9	38	10	48	170	420
	Change (N)	1	-6	---	-1	-1	0	0	-7	-14
2002-2003	1st Competition	24	39	---	10	36	10	49	168	435
	Last Competition	22	39	---	9	36	10	47	163	411
	Change (N)	-2	0	---	-1	0	0	-2	-5	-24
2003-2004	1st Competition	25	44	---	10	35	10	49	173	420
	Last Competition	25	46	---	10	35	10	50	176	419
	Change (N)	0	2	---	0	0	0	1	3	-1
2004-2005	1st Competition	30	49	---	10	37	9	58	193	454
	Last Competition	27	40	---	10	37	9	54	177	429
	Change (N)	-3	-9	---	0	0	0	-4	-16	-25
2005-2006	1st Competition	26	33	---	10	36	10	47	162	426
	Last Competition	23	33	---	9	35	10	48	158	413
	Change (N)	-3	0	---	-1	-1	0	1	-4	-13
2006-2007	1st Competition	26	45	---	9	33	9	51	173	439
	Last Competition	26	42	---	9	33	9	52	171	425
	Change (N)	0	-3	---	0	0	0	1	-2	-14
2007-2008	1st Competition	25	42	---	6	38	10	49	170	432
	Last Competition	26	42	---	7	38	10	45	168	430
	Change (N)	1	0	---	1	0	0	-4	-2	-2
2008-2009	1st Competition	24	49	---	5	38	10	42	168	461
	Last Competition	24	42	---	7	37	10	38	158	439
	Change (N)	0	-7	---	2	-1	0	-4	-10	-22
2009-2010	1st Competition	27	50	---	8	39	10	48	182	467
	Last Competition	26	44	---	8	39	9	47	173	453
	Change (N)	-1	-6	---	0	0	-1	-1	-9	-14
2010-2011	1st Competition	26	48	---	8	36	11	50	179	436
	Last Competition	25	43	---	6	36	11	48	169	428
	Change (N)	-1	-5	---	-2	0	0	-2	-10	-8
2011-2012	1st Competition	26	51	---	7	35	13	53	185	463
	Last Competition	25	42	---	8	34	12	45	166	437
	Change (N)	-1	-9	---	1	-1	-1	-8	-19	-26
2012-2013	1st Competition	30	51	---	8	33	13	53	188	470
	Last Competition	24	44	---	8	34	12	54	176	441
	Change (N)	-6	-7	---	0	1	-1	1	-12	-29
2013-2014	1st Competition	27	54	---	7	36	12	53	189	473
	Last Competition	22	46	---	7	35	11	51	172	449
	Change (N)	-5	-8	---	0	-1	-1	-2	-17	-24
2014-2015	1st Competition	29	49	---	6	37	11	51	183	475
	Last Competition	27	44	---	7	37	9	48	172	450
	Change (N)	-2	-5	---	1	0	-2	-3	-11	-25
2015-2016	1st Competition	27	46	---	9	39	10	50	181	466
	Last Competition	27	44	---	8	39	9	52	179	451
	Change (N)	0	-2	---	-1	0	-1	2	-2	-15
2016-2017	1st Competition	29	52	---	8	36	12	54	191	479
	Last Competition	29	48	---	9	38	12	50	186	477
	Change (N)	0	-4	---	1	2	0	-4	-5	-2
2017-2018	1st Competition	28	48	---	8	42	13	51	190	489
	Last Competition	28	50	---	8	42	13	50	191	476
	Change (N)	0	2	---	0	0	0	-1	1	-13
2018-2019	1st Competition	28	45	---	9	43	11	47	183	454
	Last Competition	26	39	---	8	43	11	43	170	441
	Change (N)	-2	-6	---	-1	0	0	-4	-13	-13
2019-2020	1st Competition	29	38	---	8	48	11	44	178	446
	Last Competition	30	34	---	8	48	11	46	177	447
	Change (N)	1	-4	---	0	0	0	2	-1	1

† Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 3C: Men's Winter

Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

	Roster	Basketball	Fencing	Ice Hockey	Squash	Swimming	Wrestling	Season Total	Men's Total
1998-1999	1st Competition	16	14	28	11	21	25	115	428
	Last Competition	16	14	26	10	21	24	111	414
	Change (N)	0	0	-2	-1	0	-1	-4	-14
1999-2000	1st Competition	15	13	26	14	17	26	111	465
	Last Competition	14	13	26	11	17	23	104	444
	Change (N)	-1	0	0	-3	0	-3	-7	-21
2001-2002	1st Competition	16	14	28	7	16	20	101	434
	Last Competition	14	14	28	11	16	21	104	420
	Change (N)	-2	0	0	4	0	1	3	-14
2002-2003	1st Competition	15	15	30	9	17	27	113	435
	Last Competition	14	15	30	11	15	23	108	411
	Change (N)	-1	0	0	2	-2	-4	-5	-24
2003-2004	1st Competition	12	14	26	10	18	27	107	420
	Last Competition	12	15	26	10	18	22	103	419
	Change (N)	0	1	0	0	0	-5	-4	-1
2004-2005	1st Competition	15	14	28	12	20	22	111	454
	Last Competition	14	15	27	10	19	22	107	429
	Change (N)	-1	1	-1	-2	-1	0	-4	-25
2005-2006	1st Competition	14	15	28	10	22	25	114	426
	Last Competition	11	15	26	12	22	20	106	413
	Change (N)	-3	0	-2	2	0	-5	-8	-13
2006-2007	1st Competition	12	15	26	11	24	22	110	439
	Last Competition	10	15	25	12	24	21	107	425
	Change (N)	-2	0	-1	1	0	-1	-3	-14
2007-2008	1st Competition	15	14	25	11	23	26	114	432
	Last Competition	14	14	23	13	23	27	114	430
	Change (N)	-1	0	-2	2	0	1	0	-2
2008-2009	1st Competition	14	15	29	10	22	27	117	461
	Last Competition	12	15	27	12	22	25	113	439
	Change (N)	-2	0	-2	2	0	-2	-4	-22
2009-2010	1st Competition	12	14	29	11	24	27	117	467
	Last Competition	10	16	29	13	23	25	116	453
	Change (N)	-2	2	0	2	-1	-2	-1	-14
2010-2011	1st Competition	12	14	25	11	22	21	105	436
	Last Competition	11	15	26	13	22	16	103	428
	Change (N)	-1	1	1	2	0	-5	-2	-8
2011-2012	1st Competition	12	14	29	11	20	22	108	463
	Last Competition	12	13	30	13	20	20	108	437
	Change (N)	0	-1	1	2	0	-2	0	-26
2012-2013	1st Competition	11	15	27	11	23	25	112	470
	Last Competition	10	15	24	13	23	25	110	441
	Change (N)	-1	0	-3	2	0	0	-2	-29
2013-2014	1st Competition	13	14	25	11	25	27	115	473
	Last Competition	13	15	25	13	25	25	116	449
	Change (N)	0	1	0	2	0	-2	1	-24
2014-2015	1st Competition	14	14	27	11	30	25	121	475
	Last Competition	13	15	24	13	29	24	118	450
	Change (N)	-1	1	-3	2	-1	-1	-3	-25
2015-2016	1st Competition	16	13	26	13	30	23	121	466
	Last Competition	15	13	26	13	28	21	116	451
	Change (N)	-1	0	0	0	-2	-2	-5	-15
2016-2017	1st Competition	15	11	28	11	26	25	116	479
	Last Competition	15	12	26	11	27	24	115	477
	Change (N)	0	1	-2	0	1	-1	-1	-2
2017-2018	1st Competition	14	10	27	13	25	26	115	489
	Last Competition	12	10	27	14	22	23	108	476
	Change (N)	-2	0	0	1	-3	-3	-7	-13
2018-2019	1st Competition	15	8	28	13	28	26	118	454
	Last Competition	15	9	29	14	28	25	120	441
	Change (N)	0	1	1	1	0	-1	2	-13
2019-2020	1st Competition	14	11	29	15	28	22	119	446
	Last Competition	14	11	30	15	28	23	121	447
	Change (N)	0	0	1	0	0	1	2	1

† Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 3D: Women's Fall

Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

Roster	Cross-Country	Field Hockey	Rugby	Soccer	Volleyball	Season Total	Women's Total	
1998-1999	1st Competitor	27	25	---	32	25	109	482
	Last Competitor	25	24	---	30	21	100	457
	Change (N)	-2	-1	---	-2	-4	-9	-25
1999-2000	1st Competitor	27	32	---	49	21	129	510
	Last Competitor	26	32	---	49	21	128	488
	Change (N)	-1	0	---	0	0	-1	-22
2001-2002	1st Competitor	21	26	---	22	14	83	423
	Last Competitor	21	24	---	22	14	81	403
	Change (N)	0	-2	---	0	0	-2	-20
2002-2003	1st Competitor	24	22	---	28	18	92	465
	Last Competitor	24	22	---	28	18	92	455
	Change (N)	0	0	---	0	0	0	-10
2003-2004	1st Competitor	25	27	---	28	16	96	484
	Last Competitor	25	27	---	26	16	94	469
	Change (N)	0	0	---	-2	0	-2	-15
2004-2005	1st Competitor	26	24	---	24	15	89	441
	Last Competitor	27	24	---	23	14	88	416
	Change (N)	1	0	---	-1	-1	-1	-25
2005-2006	1st Competitor	22	24	---	26	17	89	450
	Last Competitor	22	24	---	24	16	86	428
	Change (N)	0	0	---	-2	-1	-3	-22
2006-2007	1st Competitor	24	20	---	28	18	90	429
	Last Competitor	24	20	---	26	18	88	402
	Change (N)	0	0	---	-2	0	-2	-27
2007-2008	1st Competitor	29	23	---	32	17	101	412
	Last Competitor	29	22	---	31	17	99	417
	Change (N)	0	-1	---	-1	0	-2	5
2008-2009	1st Competitor	34	24	---	30	17	105	440
	Last Competitor	32	23	---	29	17	101	434
	Change (N)	-2	-1	---	-1	0	-4	-6
2009-2010	1st Competitor	21	21	---	25	20	87	400
	Last Competitor	20	21	---	25	20	86	409
	Change (N)	-1	0	---	0	0	-1	9
2010-2011	1st Competitor	35	21	---	26	20	102	457
	Last Competitor	35	21	---	25	19	100	453
	Change (N)	0	0	---	-1	-1	-2	-4
2011-2012	1st Competitor	33	23	---	27	23	106	455
	Last Competitor	34	20	---	25	23	102	451
	Change (N)	1	-3	---	-2	0	-4	-4
2012-2013	1st Competitor	40	19	---	28	20	107	492
	Last Competitor	39	19	---	27	20	105	473
	Change (N)	-1	0	---	-1	0	-2	-19
2013-2014	1st Competitor	33	20	---	27	18	98	482
	Last Competitor	35	20	---	27	18	100	469
	Change (N)	2	0	---	0	0	2	-13
2014-2015	1st Competitor	32	22	23	25	17	119	460
	Last Competitor	33	22	37	26	17	135	462
	Change (N)	1	0	14	1	0	16	2
2015-2016	1st Competitor	32	22	34	24	17	129	483
	Last Competitor	32	21	38	24	17	132	476
	Change (N)	0	-1	4	0	0	3	-7
2016-2017	1st Competitor	33	23	17	24	15	112	465
	Last Competitor	33	23	24	24	15	119	475
	Change (N)	0	0	7	0	0	7	10
2017-2018	1st Competitor	32	24	20	23	16	115	481
	Last Competitor	32	24	22	22	16	116	479
	Change (N)	0	0	2	-1	0	1	-2
2018-2019	1st Competitor	24	23	20	25	19	111	469
	Last Competitor	24	23	32	25	19	123	464
	Change (N)	0	0	12	0	0	12	-5
2019-2020	1st Competitor	18	24	33	27	19	121	448
	Last Competitor	20	23	35	27	20	125	447
	Change (N)	2	-1	2	0	1	4	-1

<sup>†</sup>Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 3E: Women's Spring

Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

Roster	Crew	Equestrian	Golf	Lacrosse	Softball	Tennis	Track	Water Polo	Season Total	Women's Total
1998-1999	1st Competition	76	31	8	30	19	8	52	15	239
	Last Competition	67	33	9	29	15	9	51	13	226
	Change (N)	-9	2	1	-1	-4	1	-1	-2	-13
1999-2000	1st Competition	75	36	10	27	16	10	59	12	245
	Last Competition	67	36	9	26	16	8	52	13	227
	Change (N)	-8	0	-1	-1	0	-2	-7	1	-18
2001-2002	1st Competition	56	35	11	30	17	12	52	18	231
	Last Competition	48	32	9	30	14	11	48	18	210
	Change (N)	-8	-3	-2	0	-3	-1	-4	0	-21
2002-2003	1st Competition	58	35	9	29	16	11	57	22	237
	Last Competition	52	35	9	30	15	11	55	20	227
	Change (N)	-6	0	0	1	-1	0	-2	-2	-10
2003-2004	1st Competition	55	35	7	33	20	9	66	17	242
	Last Competition	47	38	7	32	19	7	61	19	230
	Change (N)	-8	3	0	-1	-1	-2	-5	2	-12
2004-2005	1st Competition	50	36	6	29	17	8	54	16	216
	Last Competition	47	30	6	28	17	8	51	15	202
	Change (N)	-3	-6	0	-1	0	0	-3	-1	-14
2005-2006	1st Competition	63	34	8	27	18	11	51	13	225
	Last Competition	50	31	7	27	17	10	50	14	206
	Change (N)	-13	-3	-1	0	-1	-1	-1	1	-19
2006-2007	1st Competition	62	35	6	27	17	11	53	14	225
	Last Competition	44	32	8	25	15	10	47	14	195
	Change (N)	-18	-3	2	-2	-2	-1	-6	0	-30
2007-2008	1st Competition	48	27	6	29	14	10	50	12	196
	Last Competition	44	37	7	28	15	11	51	11	204
	Change (N)	-4	10	1	-1	1	1	1	-1	5
2008-2009	1st Competition	54	26	9	32	16	16	52	10	215
	Last Competition	51	30	7	32	17	15	42	16	210
	Change (N)	-3	4	-2	0	1	-1	-10	6	-5
2009-2010	1st Competition	49	29	9	24	18	13	47	13	202
	Last Competition	50	32	8	24	18	13	41	22	208
	Change (N)	1	3	-1	0	0	0	-6	9	6
2010-2011	1st Competition	63	30	9	25	16	12	63	16	234
	Last Competition	45	34	9	25	15	11	60	31	230
	Change (N)	-18	4	0	0	-1	-1	-3	15	-4
2011-2012	1st Competition	42	28	9	29	18	11	61	19	217
	Last Competition	40	31	8	30	18	12	57	20	216
	Change (N)	-2	3	-1	1	0	1	-4	1	-1
2012-2013	1st Competition	54	37	8	29	20	12	68	23	251
	Last Competition	43	39	6	25	20	11	65	23	232
	Change (N)	-11	2	-2	-4	0	-1	-3	0	-19
2013-2014	1st Competition	57	41	7	32	19	10	67	22	255
	Last Competition	48	36	8	32	17	9	68	22	240
	Change (N)	-9	-5	1	0	-2	-1	1	0	-15
2014-2015	1st Competition	54	31	9	29	15	11	60	16	225
	Last Competition	46	30	9	29	14	9	60	16	213
	Change (N)	-8	-1	0	0	-1	-2	0	0	-12
2015-2016	1st Competition	57	29	9	27	18	11	66	22	239
	Last Competition	44	29	9	27	18	11	63	29	230
	Change (N)	-13	0	0	0	0	0	-3	7	-9
2016-2017	1st Competition	50	30	9	30	19	10	62	26	236
	Last Competition	44	31	8	30	19	10	64	28	234
	Change (N)	-6	1	-1	0	0	0	2	2	-2
2017-2018	1st Competition	54	30	10	34	18	10	64	24	244
	Last Competition	50	28	10	34	18	9	64	24	237
	Change (N)	-4	-2	0	0	0	-1	0	0	-7
2018-2019	1st Competition	54	24	11	33	20	10	54	24	230
	Last Competition	48	19	11	32	20	10	50	24	214
	Change (N)	-6	-5	0	-1	0	0	-4	0	-16
2019-2020	1st Competition	50	24	9	30	18	8	43	23	205
	Last Competition	48	23	9	30	18	8	43	23	202
	Change (N)	-2	-1	0	0	0	0	0	0	-3

† Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 3F: Women's Winter

Change in Roster Size from Date of First Competition to Date of Last, 1998-1999 through 2019-2020

Roster	Basketball	Fencing	Gymnastics	Ice Hockey	Skiing	Squash	Swimming	Season Total	Women's Total
1998-1999	1st Competition	17	28	18	18	10	17	26	134
	Last Competition	15	27	18	19	10	17	25	131
	Change (N)	-2	-1	0	1	0	0	-1	-3
1999-2000	1st Competition	14	22	18	24	14	18	26	136
	Last Competition	13	22	18	24	12	19	25	133
	Change (N)	-1	0	0	0	-2	1	-1	-3
2001-2002	1st Competition	11	11	13	22	11	17	24	109
	Last Competition	13	15	14	23	10	15	22	112
	Change (N)	2	4	1	1	-1	-2	-2	-3
2002-2003	1st Competition	14	23	17	27	14	16	25	136
	Last Competition	14	24	17	26	14	17	24	136
	Change (N)	0	1	0	-1	0	1	-1	0
2003-2004	1st Competition	18	23	18	25	13	16	33	146
	Last Competition	18	19	17	27	13	18	33	145
	Change (N)	0	-4	-1	2	0	2	0	-1
2004-2005	1st Competition	16	23	14	24	14	13	32	136
	Last Competition	14	19	14	23	12	15	29	126
	Change (N)	-2	-4	0	-1	-2	2	-3	-10
2005-2006	1st Competition	16	21	15	22	13	14	35	136
	Last Competition	15	22	15	22	13	18	31	136
	Change (N)	-1	1	0	0	0	4	-4	0
2006-2007	1st Competition	15	14	10	21	12	14	28	114
	Last Competition	15	17	10	21	12	16	28	119
	Change (N)	0	3	0	0	0	2	0	5
2007-2008	1st Competition	16	16	13	22	10	15	23	115
	Last Competition	16	15	12	22	11	15	23	114
	Change (N)	0	-1	-1	0	1	0	0	-1
2008-2009	1st Competition	16	16	15	26	8	11	28	120
	Last Competition	15	17	15	26	8	14	28	123
	Change (N)	-1	1	0	0	0	3	0	3
2009-2010	1st Competition	14	15	13	20	7	14	28	111
	Last Competition	15	15	13	20	9	15	28	115
	Change (N)	1	0	0	0	2	1	0	4
2010-2011	1st Competition	15	16	15	22	9	14	30	121
	Last Competition	14	16	15	22	9	17	30	123
	Change (N)	-1	0	0	0	0	3	0	-4
2011-2012	1st Competition	18	19	15	24	8	14	34	132
	Last Competition	18	23	15	19	8	16	34	133
	Change (N)	0	4	0	-5	0	2	0	1
2012-2013	1st Competition	16	18	17	23	7	17	36	134
	Last Competition	16	19	17	23	7	19	35	136
	Change (N)	0	1	0	0	0	2	-1	2
2013-2014	1st Competition	12	19	16	22	10	16	34	129
	Last Competition	12	19	16	21	10	18	33	129
	Change (N)	0	0	0	-1	0	2	-1	-13
2014-2015	1st Competition	14	15	15	21	9	13	29	116
	Last Competition	14	16	13	21	9	14	27	114
	Change (N)	0	1	-2	0	0	1	-2	2
2015-2016	1st Competition	14	13	18	21	9	13	27	115
	Last Competition	12	13	18	21	9	14	27	114
	Change (N)	-2	0	0	0	0	1	0	-1
2016-2017	1st Competition	12	11	18	25	7	13	31	117
	Last Competition	15	12	17	25	7	14	32	122
	Change (N)	3	1	-1	0	0	1	1	5
2017-2018	1st Competition	17	13	17	26	3	12	34	122
	Last Competition	17	13	17	26	3	12	38	126
	Change (N)	0	0	0	0	0	0	4	-2
2018-2019	1st Competition	18	13	14	23	9	14	37	128
	Last Competition	16	14	14	23	9	14	37	127
	Change (N)	-2	1	0	0	0	0	0	-1
2019-2020	1st Competition	15	11	15	19	10	14	38	122
	Last Competition	12	13	15	18	10	14	38	120
	Change (N)	-3	2	0	-1	0	0	0	-2

<sup>†</sup> Note: I understand that there is some uncertainty about the exact number of varsity athletic opportunities at Brown in the 2000-2001 school year, due to a dispute about how those opportunities should be counted. For this reason, data from 2000-2001 is not included in Table 3.

Table 4  
Comparison of 2018-2019 Pre-Season Official Athletics Roster with In-Season Rosters

Change Between 2018-2019 Pre-Season  
Official Athletics Roster and

		2018-2019 Pre-Season Official Athletics Roster	First Day of Competition	Last Day of Competition	Average	First Day of Competition	Last Day of Competition	Average
Men's Fall	Cross-Country	16	17	17	17	1	1	1
	Football	94	91	89	90	-3	-5	-4
	Soccer	27	26	26	26	-1	-1	-1
	Water Polo	21	19	19	19	-2	-2	-2
	Season Total	158	153	151	152	-5	-7	-6
Men's Spring	Baseball	29	28	26	27	-1	-3	-2
	Crew	53	45	39	42	-8	-14	-11
	Golf	9	9	8	8.5	0	-1	-0.5
	Lacrosse	46	43	43	43	-3	-3	-3
	Tennis	11	11	11	11	0	0	0
	Track	48	47	43	45	-1	-5	-3
	Season Total	196	183	170	176.5	-13	-26	-19.5
Men's Winter	Basketball	16	15	15	15	-1	-1	-1
	Fencing	10	8	9	8.5	-2	-1	-1.5
	Ice Hockey	28	28	29	28.5	0	1	0.5
	Squash	15	13	14	13.5	-2	-1	-1.5
	Swimming	31	28	28	28	-3	-3	-3
	Wrestling	29	26	25	25.5	-3	-4	-3.5
	Season Total	129	118	120	119	-11	-9	-10
Men	Men's Total	483	454	441	447.5	-29	-42	-35.5
Women's Fall	Cross-Country	25	24	24	24	-1	-1	-1
	Field Hockey	24	23	23	23	-1	-1	-1
	Rugby	22	20	32	26	-2	10	4
	Soccer	26	25	25	25	-1	-1	-1
	Volleyball	19	19	19	19	0	0	0
	Season Total	116	111	123	117	-5	7	1
Women's Spring	Crew	53	54	48	51	1	-5	-2
	Golf	11	11	11	11	0	0	0
	Lacrosse	37	33	32	32.5	-4	-5	-4.5
	Tennis	10	10	10	10	0	0	0
	Track	66	54	50	52	-12	-16	-14
	Water Polo	22	24	24	24	2	2	2
	Season Total†	199	186	175	180.5	-13	-24	-18.5
Women's Winter	Basketball	20	18	16	17	-2	-4	-3
	Fencing	13	13	14	13.5	0	1	0.5
	Gymnastics	15	14	14	14	-1	-1	-1
	Ice Hockey	27	23	23	23	-4	-4	-4
	Skiing	9	9	9	9	0	0	0
	Squash	13	14	14	14	1	1	1
	Swimming	34	37	37	37	3	3	3
	Season Total	131	128	127	127.5	-3	-4	-3.5
Women	Women's Total†	446	425	425	425	-21	-21	-21

† These totals exclude Women's Equestrian and Softball, as Pre-Season Official Athletics Rosters for 2018-2019 were not completed for these sports. For the purposes of this analysis, which compares the Pre-Season roster to rosters at various points in the season, I have excluded these teams.

Table 5  
Comparison of 2019-2020 Pre-Season Official Athletics Roster with In-Season Rosters

Change Between 2019-2020 Pre-Season  
Official Athletics Roster and

	Team	2019-20 Pre-Season Official Athletics Roster	First Day of Competition	Last Day of Competition	Average	First Day of Competition	Last Day of Competition	Average
Men's Fall	Cross-Country	15	15	15	15	0	0	0
	Football	97	88	89	88.5	-9	-8	-8.5
	Soccer	28	26	25	25.5	-2	-3	-2.5
	Water Polo	20	20	20	20	0	0	0
	Season Total	160	149	149	149	-11	-11	-11
Men's Spring	Baseball	31	29	30	29.5	-2	-1	-1.5
	Crew	47	38	34	36	-9	-13	-11
	Golf	8	8	8	8	0	0	0
	Lacrosse	49	48	48	48	-1	-1	-1
	Tennis	11	11	11	11	0	0	0
	Track	47	44	46	45	-3	-1	-2
	Season Total	193	178	177	177.5	-15	-16	-15.5
Men's Winter	Basketball	15	14	14	14	-1	-1	-1
	Fencing	11	11	11	11	0	0	0
	Ice Hockey	30	29	30	29.5	-1	0	-0.5
	Squash	15	15	15	15	0	0	0
	Swimming	30	28	28	28	-2	-2	-2
	Wrestling	24	22	23	22.5	-2	-1	-1.5
Men	Season Total	125	119	121	120	-6	-4	-5
	Men's Total	478	446	447	446.5	-32	-31	-31.5
Women's Fall	Cross-Country	20	18	20	19	-2	0	-1
	Field Hockey	24	24	23	23.5	0	-1	-0.5
	Rugby	31	33	35	34	2	4	3
	Soccer	28	27	27	27	-1	-1	-1
	Volleyball	19	19	20	19.5	0	1	0.5
	Season Total	122	121	125	123	-1	3	1
Women's Spring	Crew	54	50	48	49	-4	-6	-5
	Equestrian	15	24	23	23.5	9	8	8.5
	Golf	11	9	9	9	-2	-2	-2
	Lacrosse	35	30	30	30	-5	-5	-5
	Softball	21	18	18	18	-3	-3	-3
	Tennis	9	8	8	8	-1	-1	-1
	Track	46	43	43	43	-3	-3	-3
	Water Polo	22	23	23	23	1	1	1
Women's Winter	Season Total	213	205	202	203.5	-8	-11	-9.5
	Basketball	15	15	12	13.5	0	-3	-1.5
	Fencing	13	11	13	12	-2	0	-1
	Gymnastics	16	15	15	15	-1	-1	-1
	Ice Hockey	20	19	18	18.5	-1	-2	-1.5
	Skiing	10	10	10	10	0	0	0
	Squash	13	14	14	14	1	1	1
	Swimming	38	38	38	38	0	0	0
Women	Season Total	125	122	120	121	-3	-5	-4
	Women's Total	460	448	447	447.5	-12	-13	-12.5

Figure 1A  
Comparison of 2019-2020 Participation Report  
and 2020-2021 Official Athletics Roster

Men's Teams

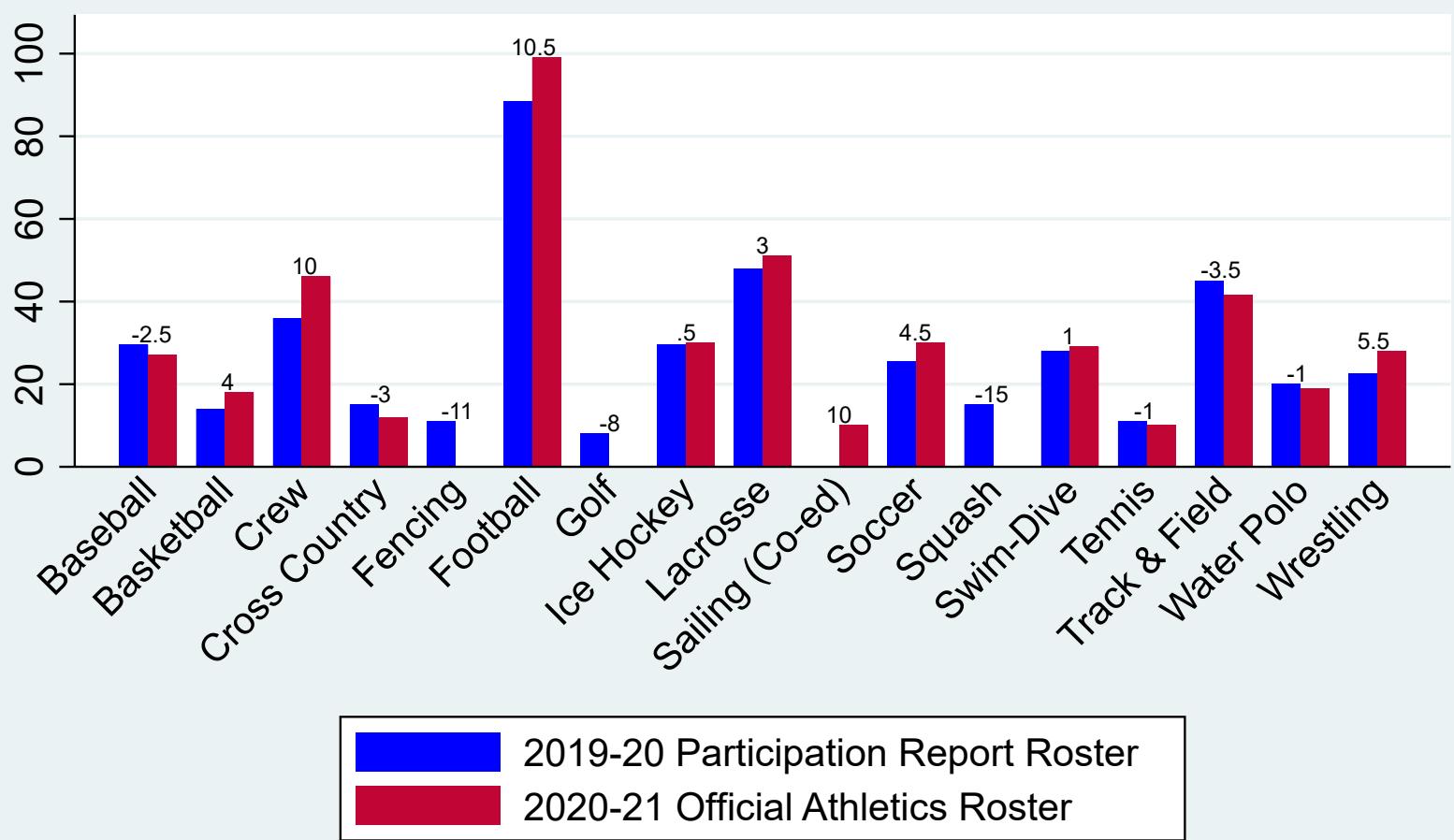


Figure 1B  
Comparison of 2019-2020 Participation Report  
and 2020-2021 Official Athletics Roster

Women's Teams

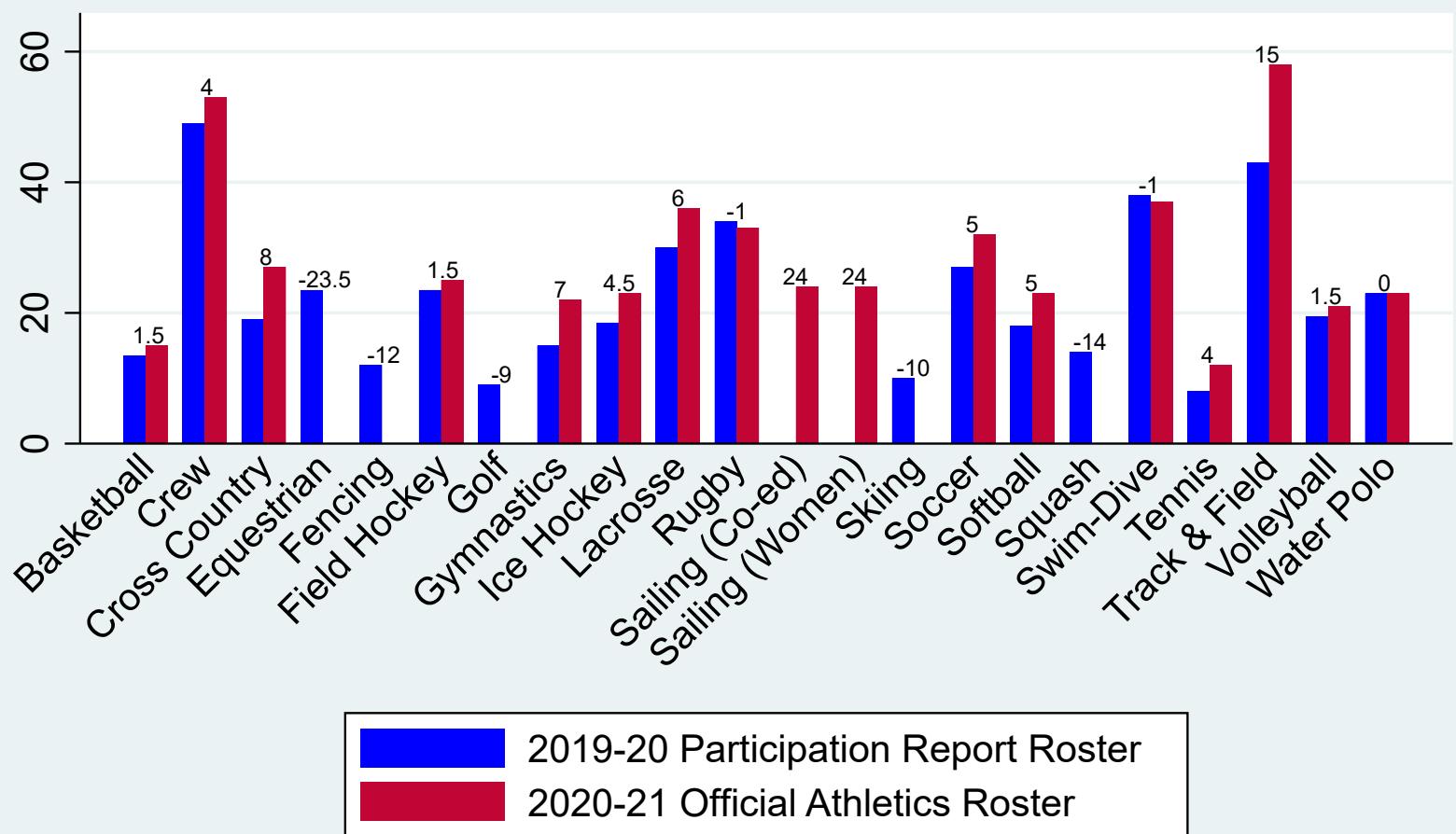


Figure 1C  
Comparison of 2019-2020 Participation Report  
and 2020-2021 Official Athletics Roster

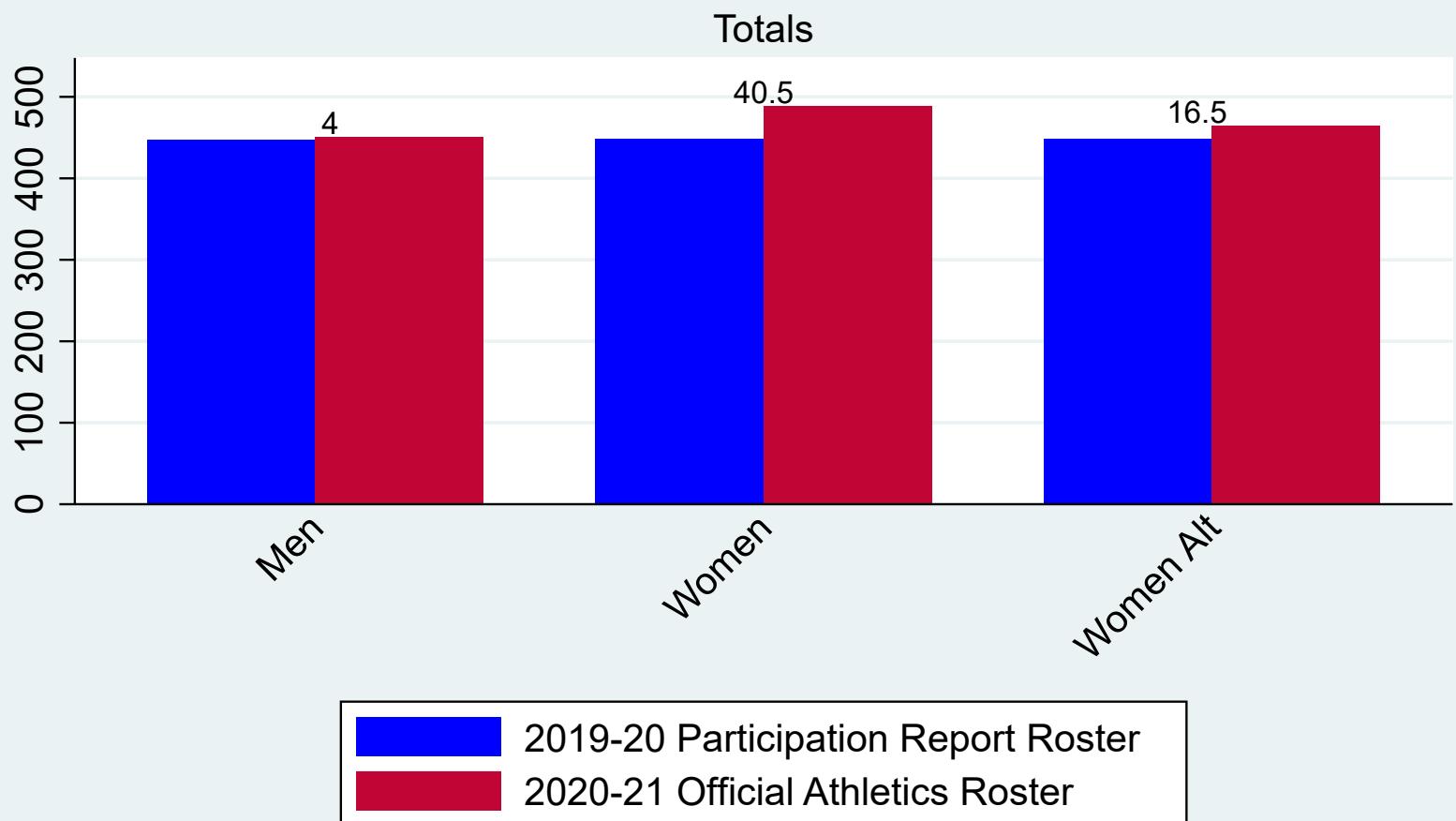
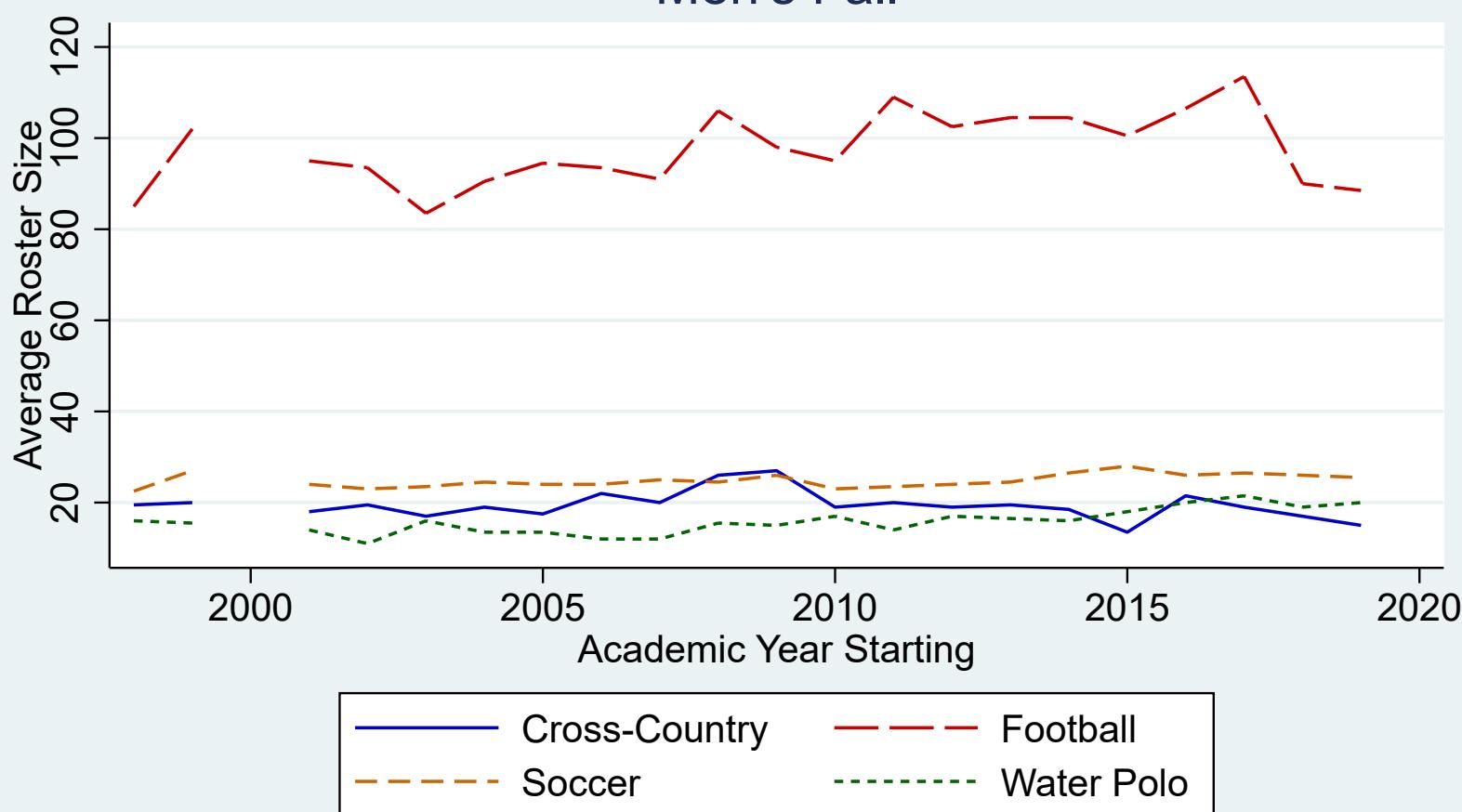
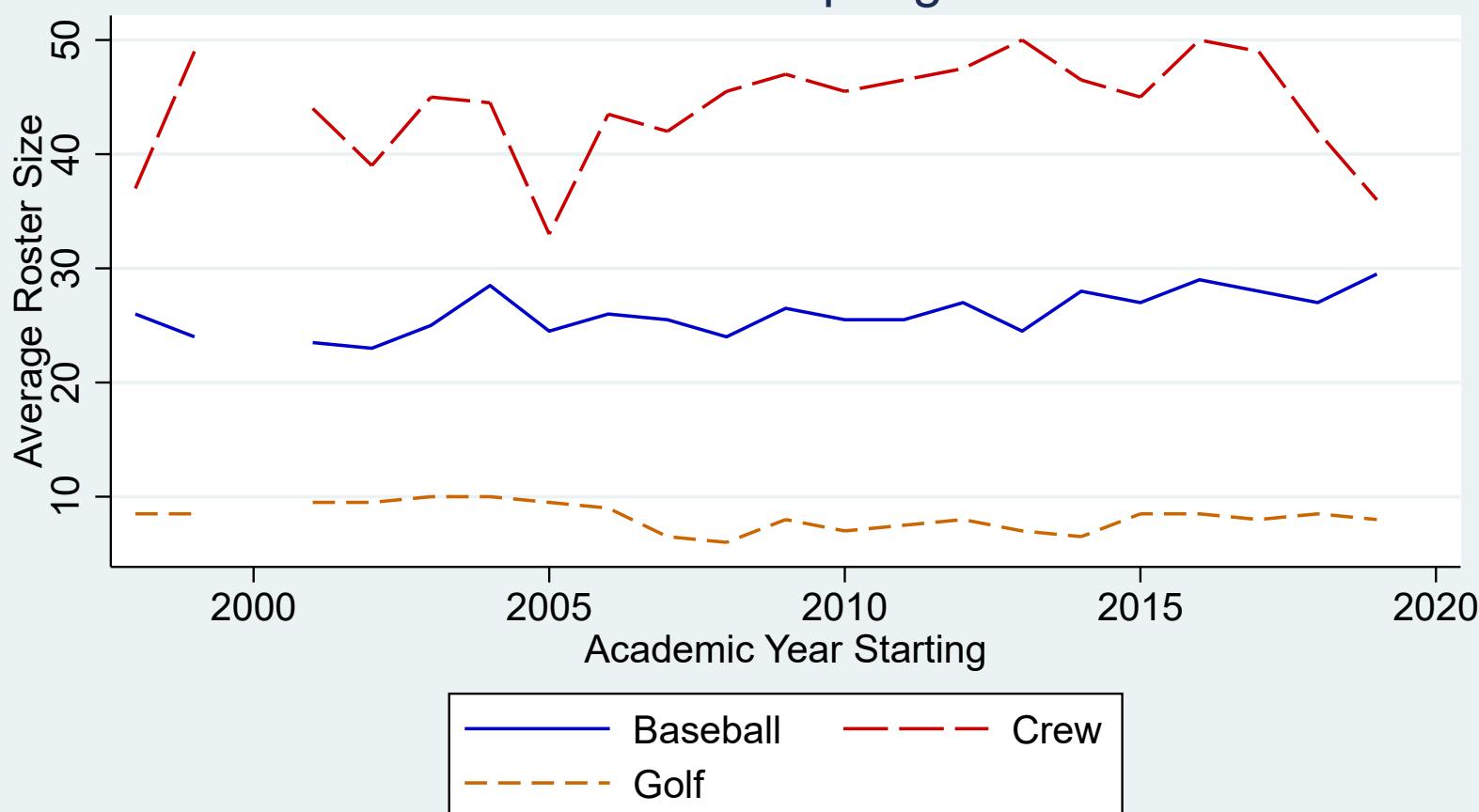


Figure 2A  
Average Roster Size by Team 1998-99 through 2019-20  
Men's Fall



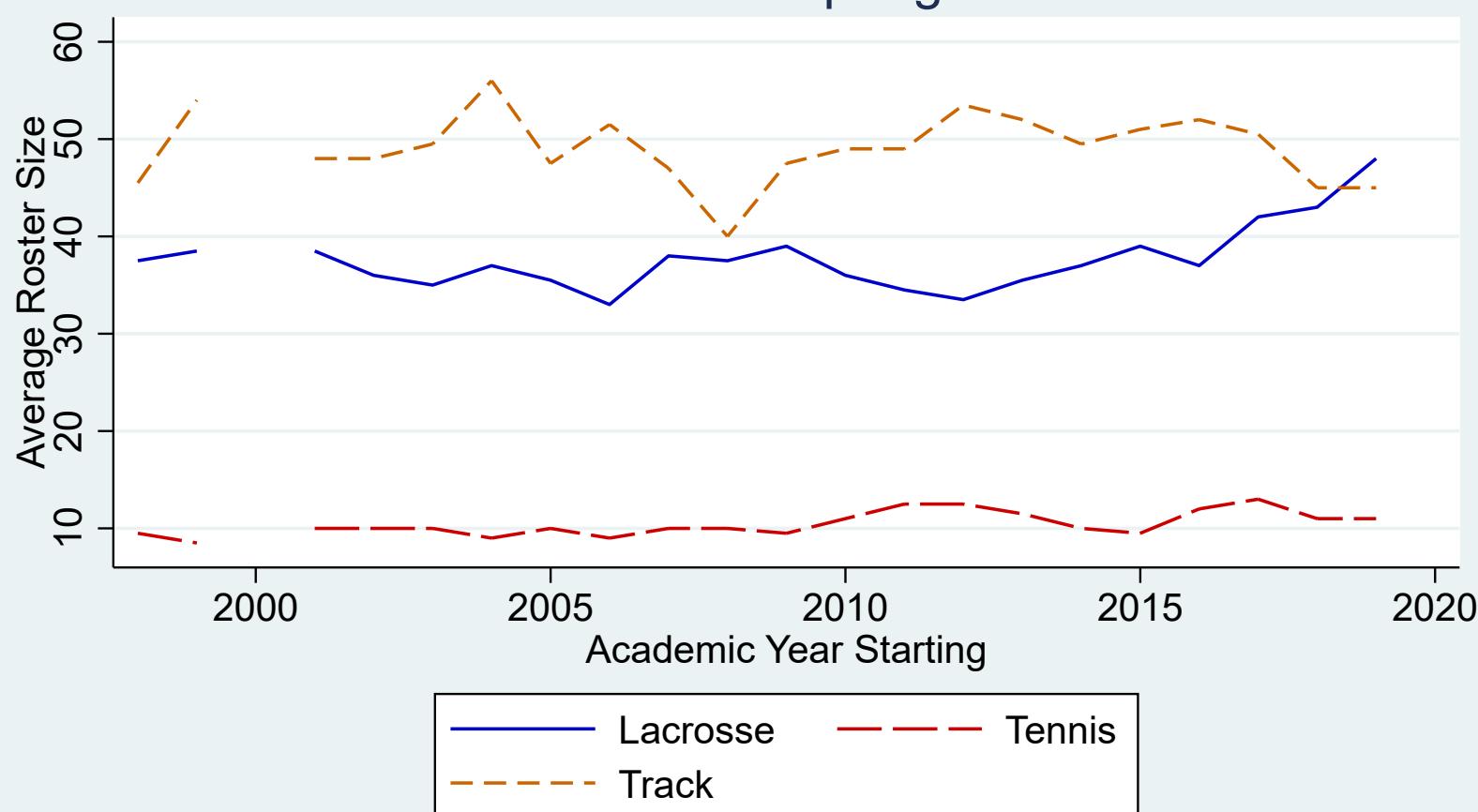
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2B  
Average Roster Size by Team 1998-99 through 2019-20  
Men's Spring



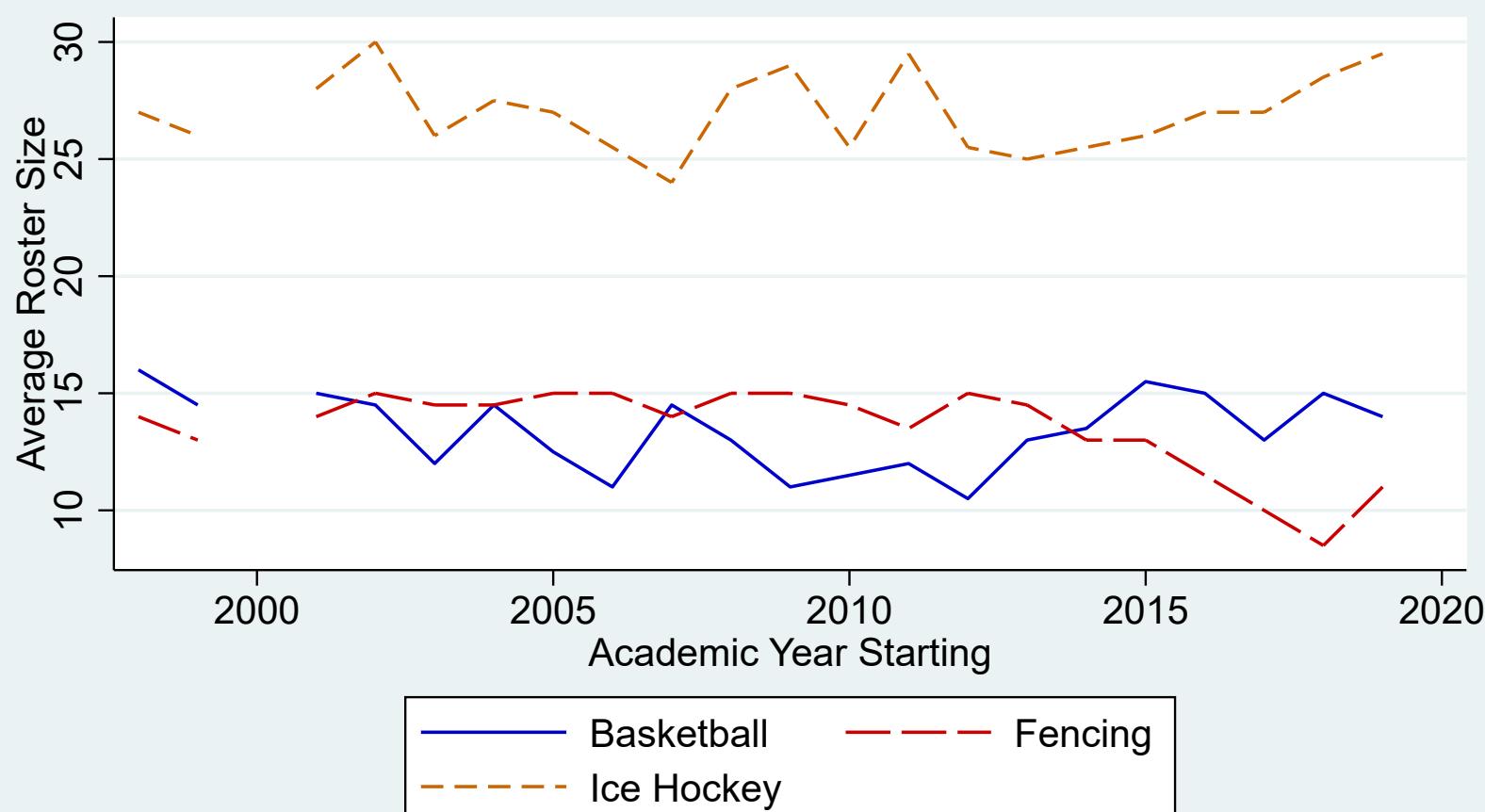
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2C  
Average Roster Size by Team 1998-99 through 2019-20  
Men's Spring



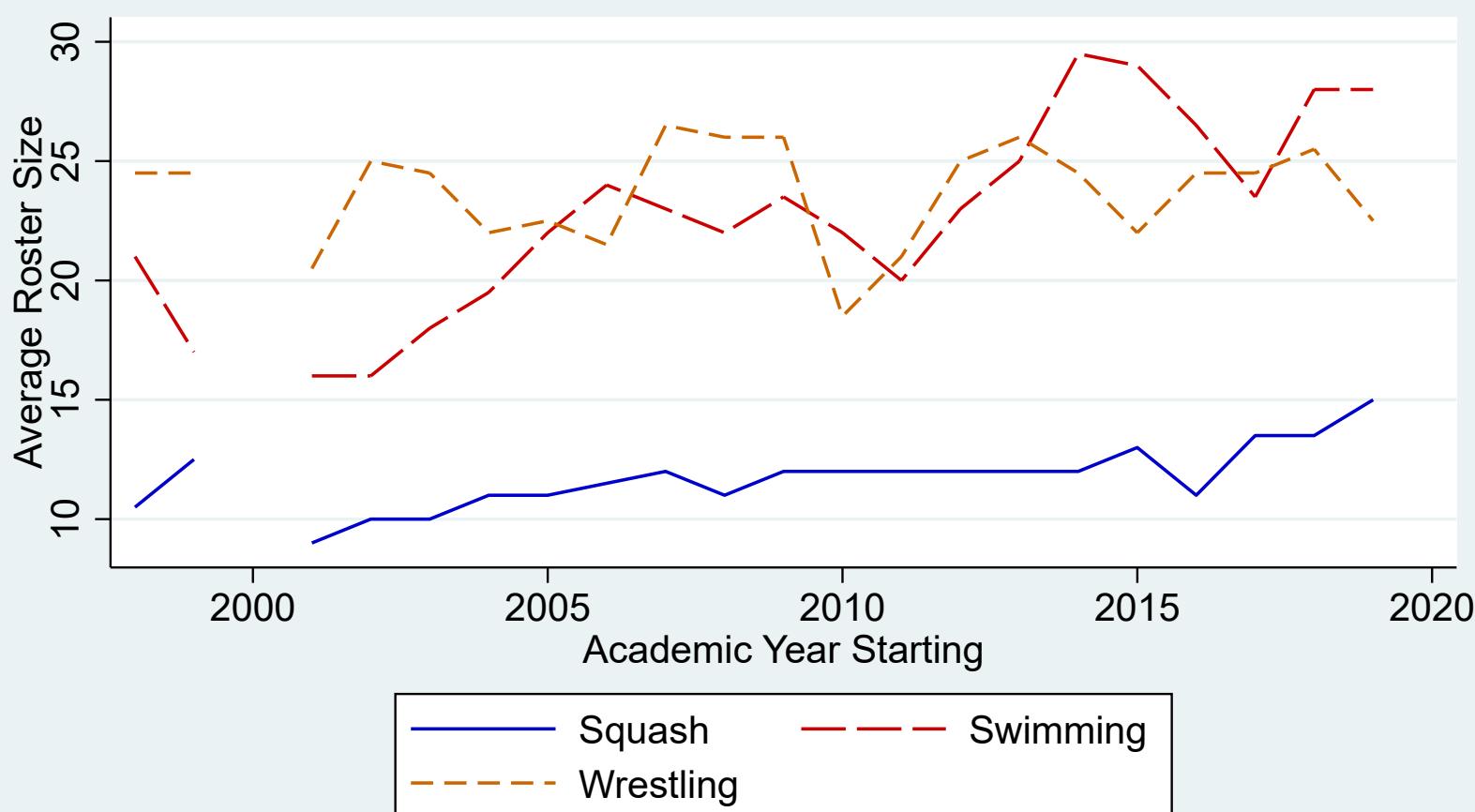
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2D  
Average Roster Size by Team 1998-99 through 2019-20  
Men's Winter



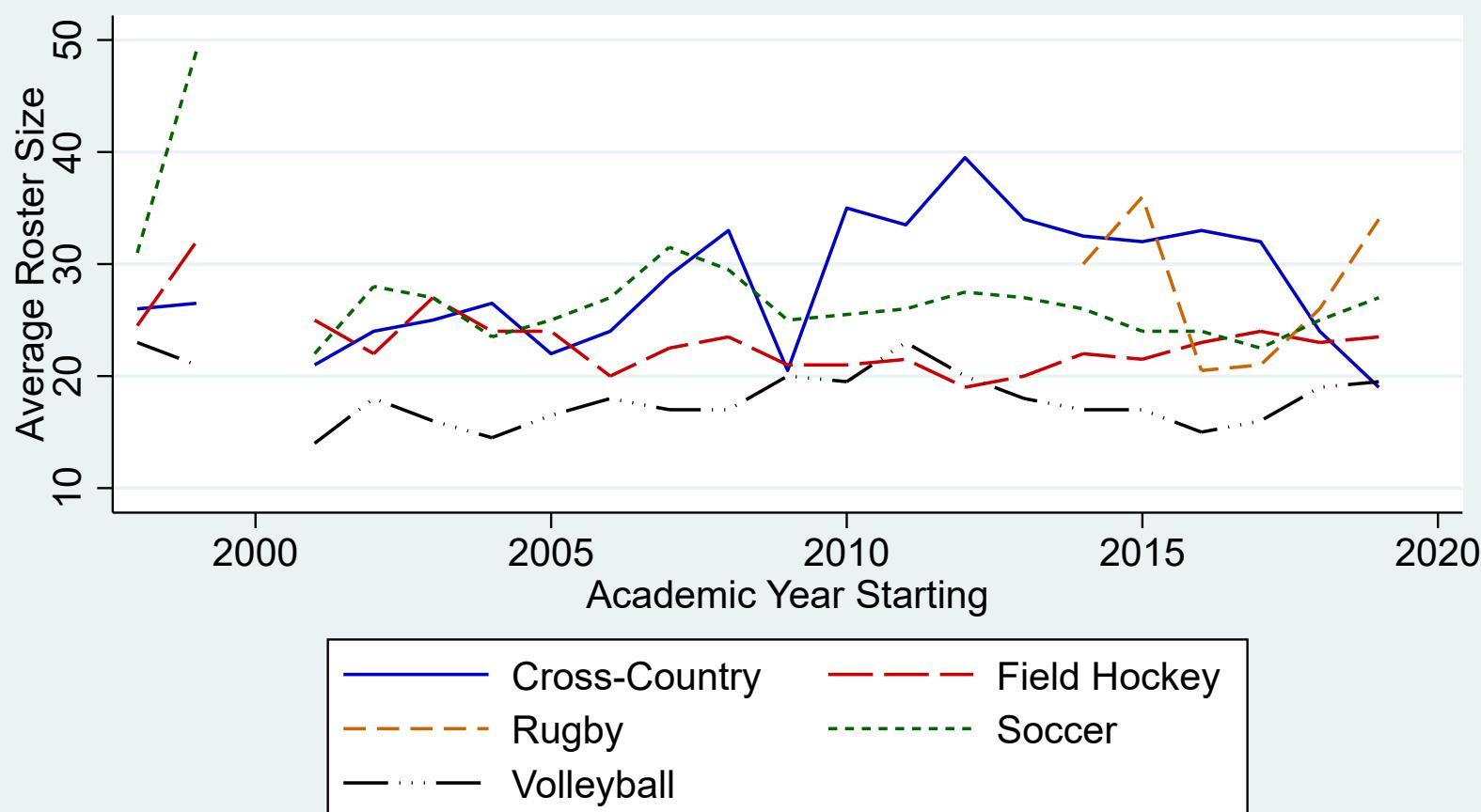
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2E  
Average Roster Size by Team 1998-99 through 2019-20  
Men's Winter



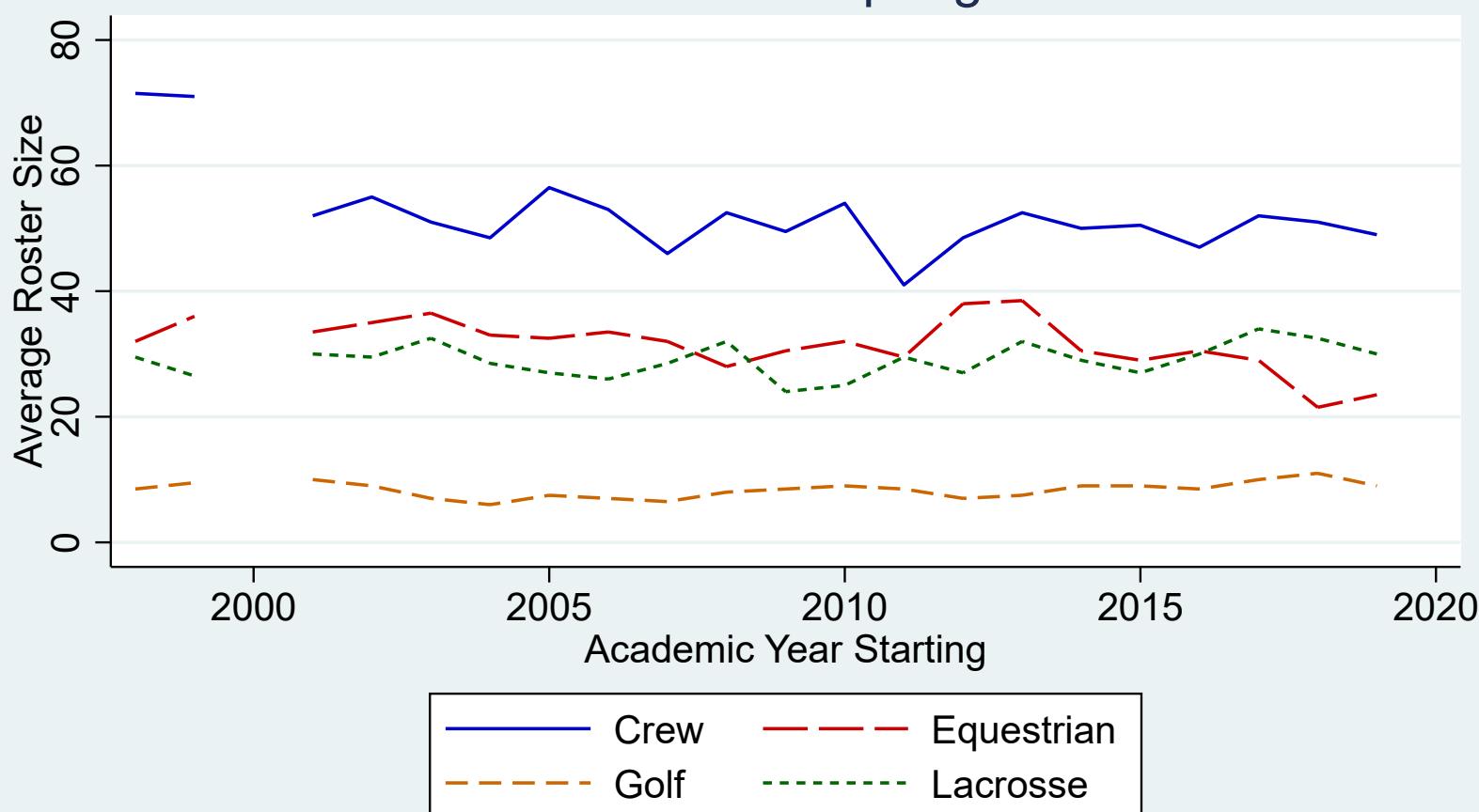
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2F  
Average Roster Size by Team 1998-99 through 2019-20  
Women's Fall



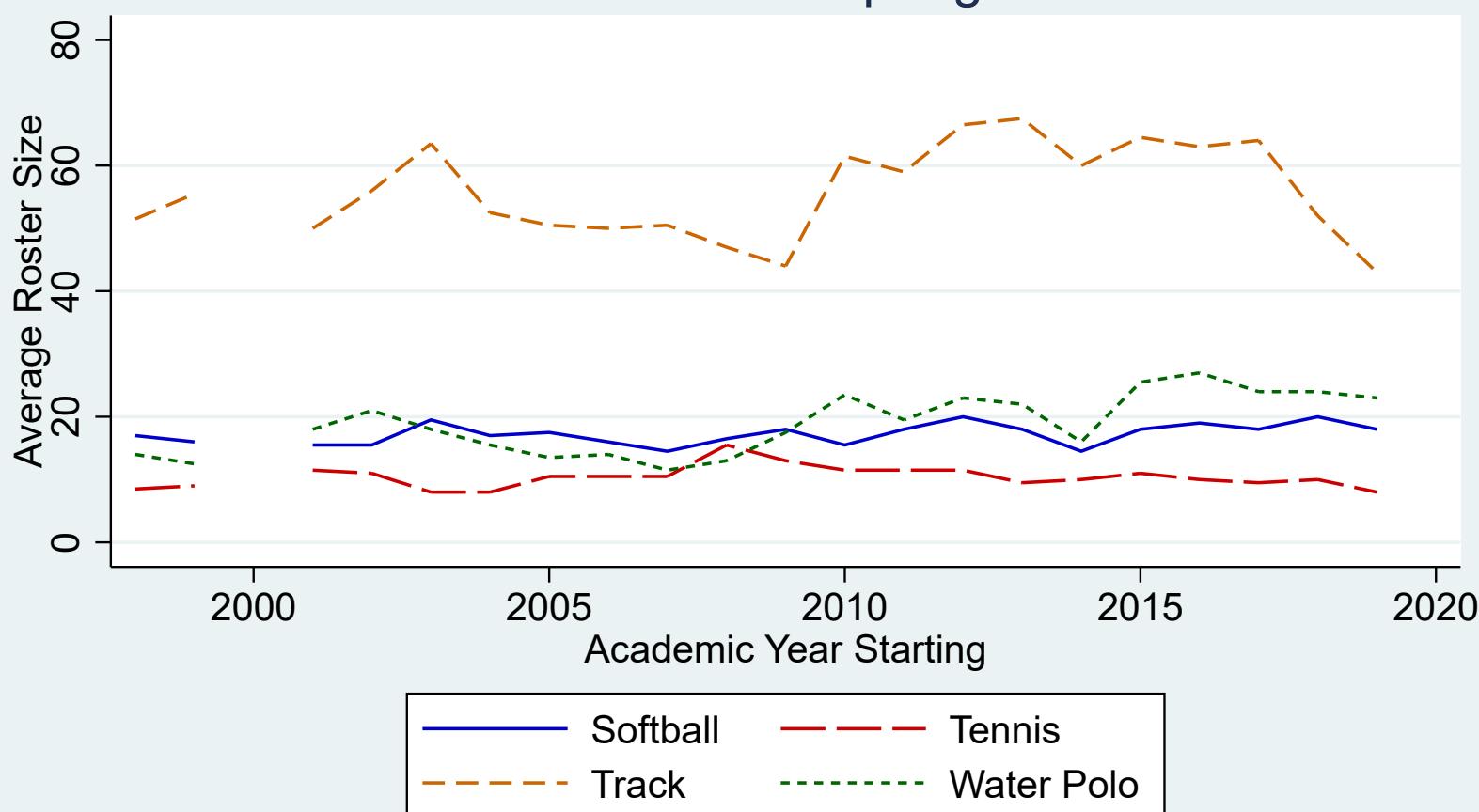
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2G  
Average Roster Size by Team 1998-99 through 2019-20  
Women's Spring



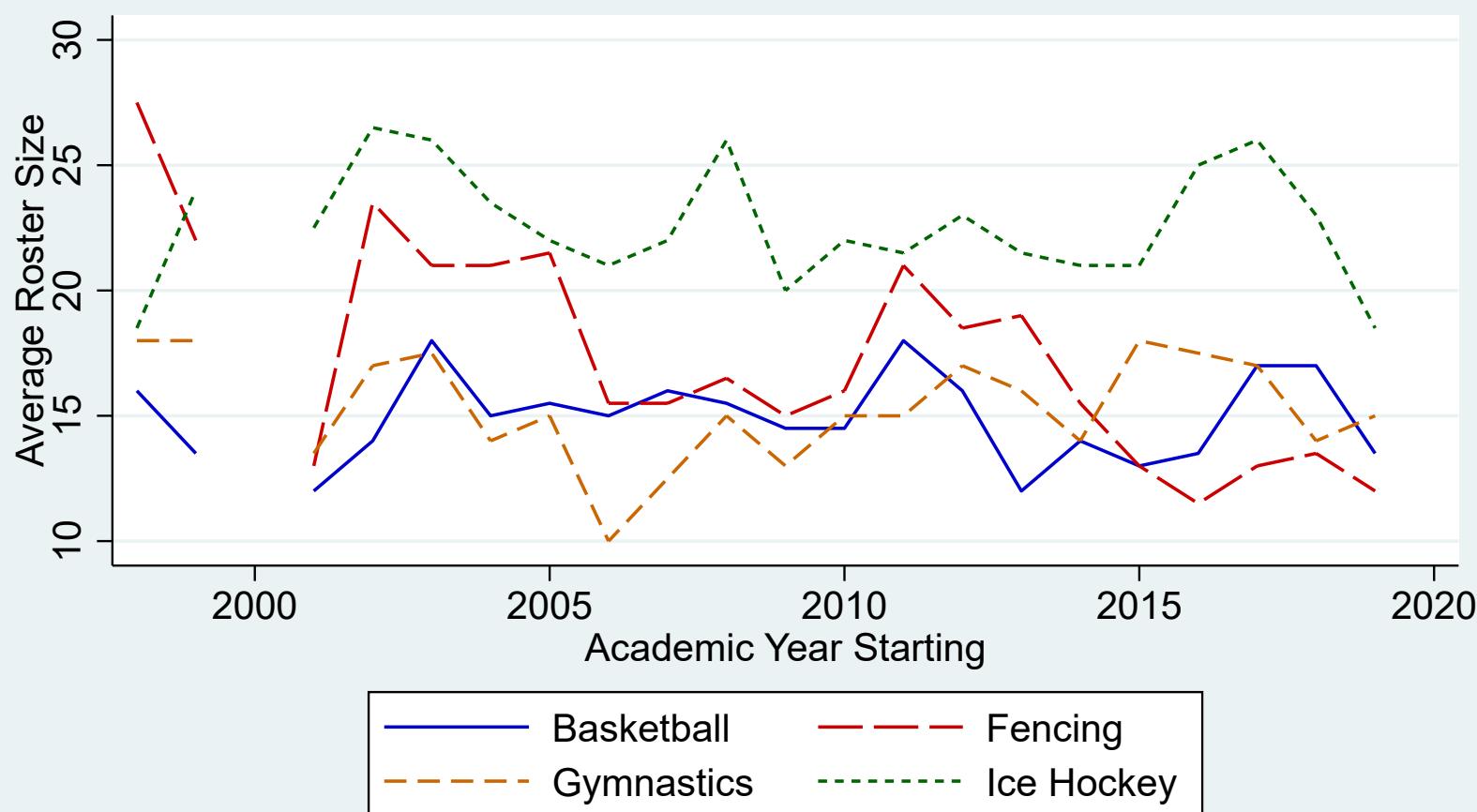
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2H  
Average Roster Size by Team 1998-99 through 2019-20  
Women's Spring



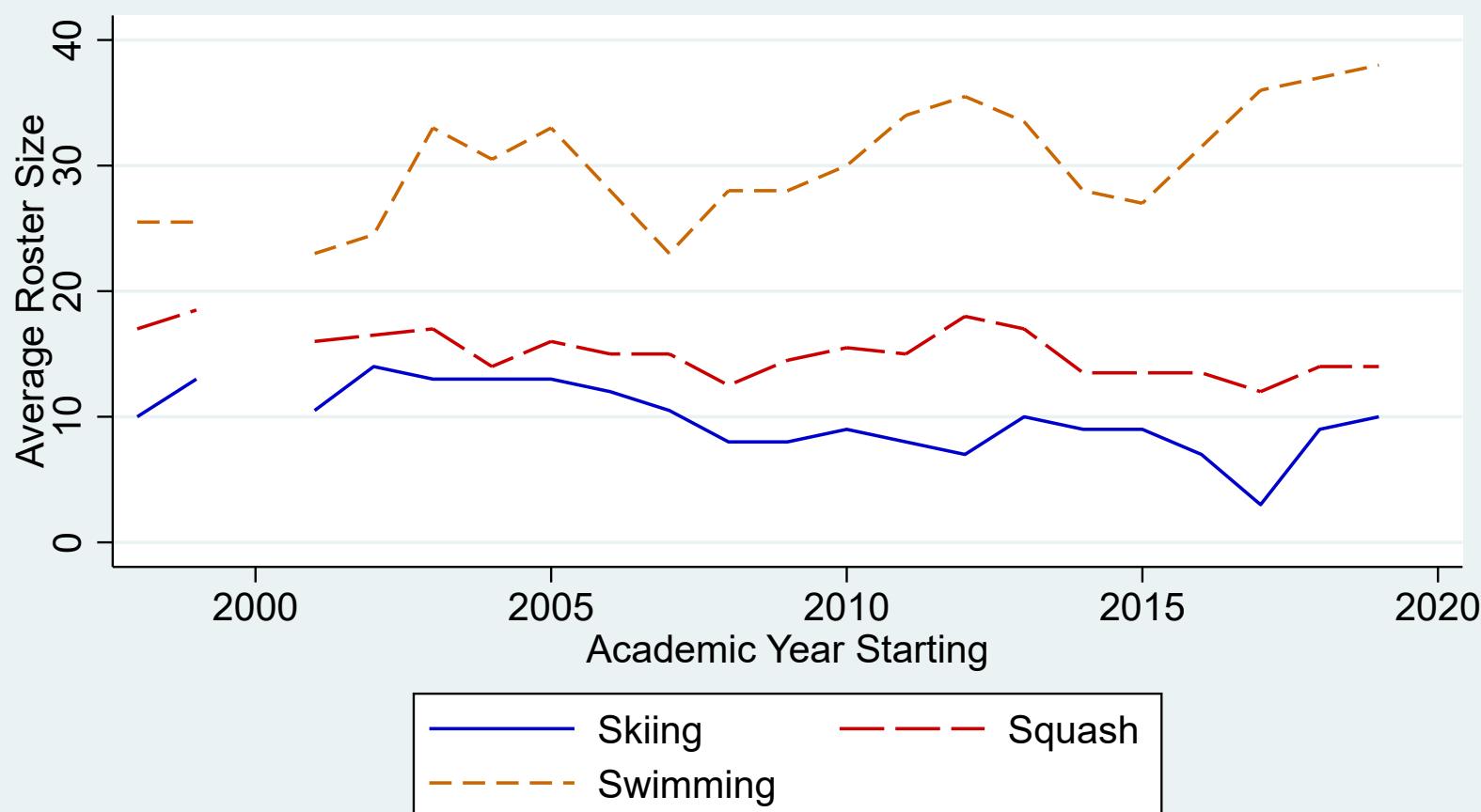
The academic year 2000-2001 is omitted. See notes to Table 2.

Figure 2I  
Average Roster Size by Team 1998-99 through 2019-20  
Women's Winter



The academic year 2000-2001 is omitted. See notes to Table 2.

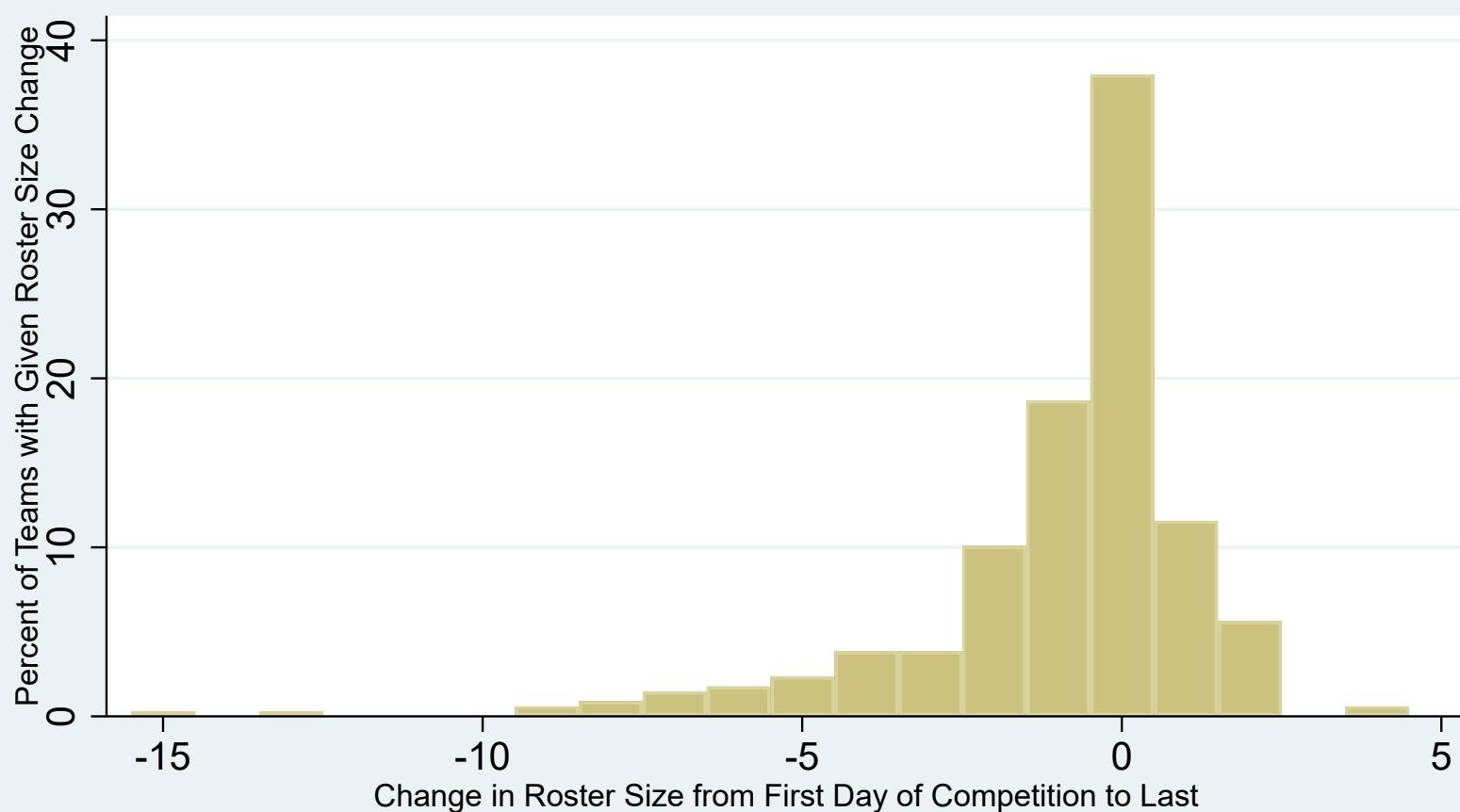
Figure 2J  
Average Roster Size by Team 1998-99 through 2019-20  
Women's Winter



The academic year 2000-2001 is omitted. See notes to Table 2.

### Figure 3A

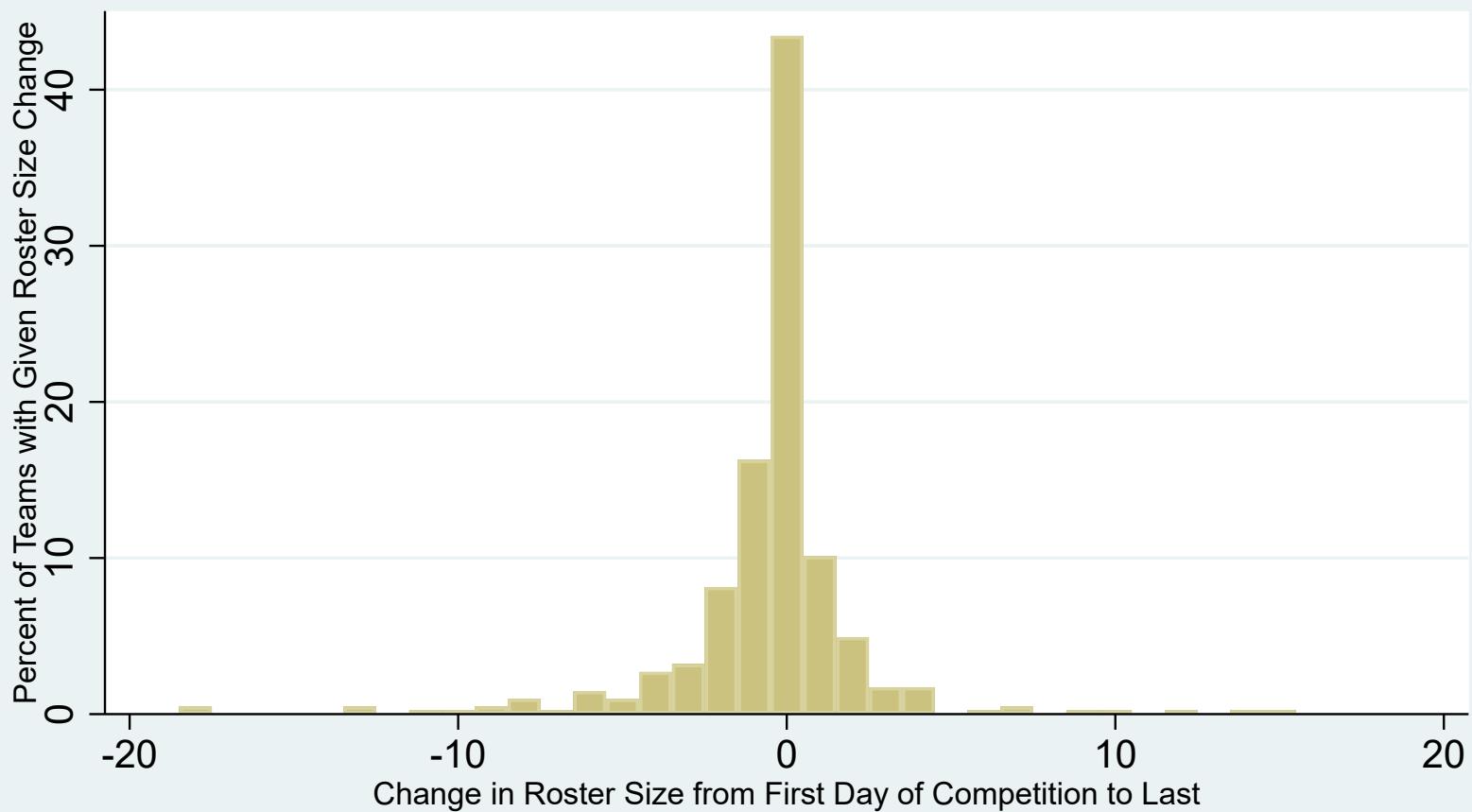
Stability of Roster Sizes from First Day to Last Day of Competition, 1998-2020  
Men's Teams



Note: observation level is a team-year combination between 1998-1999 and 2019-2020, excluding 2000-2001. See Notes to Table 3.

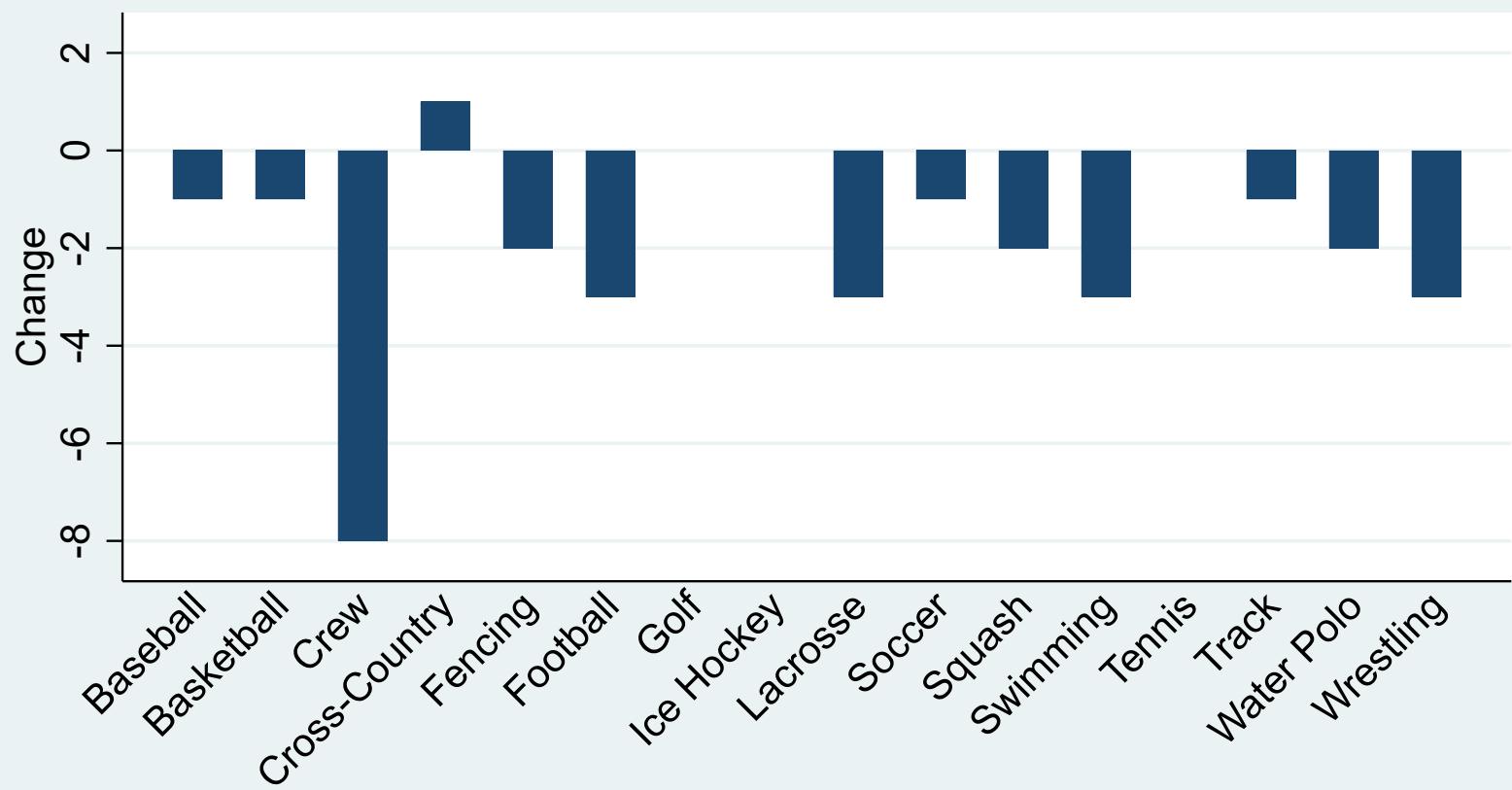
## Figure 3B

Stability of Roster Sizes from First Day to Last Day of Competition, 1998-2020  
Women's Teams



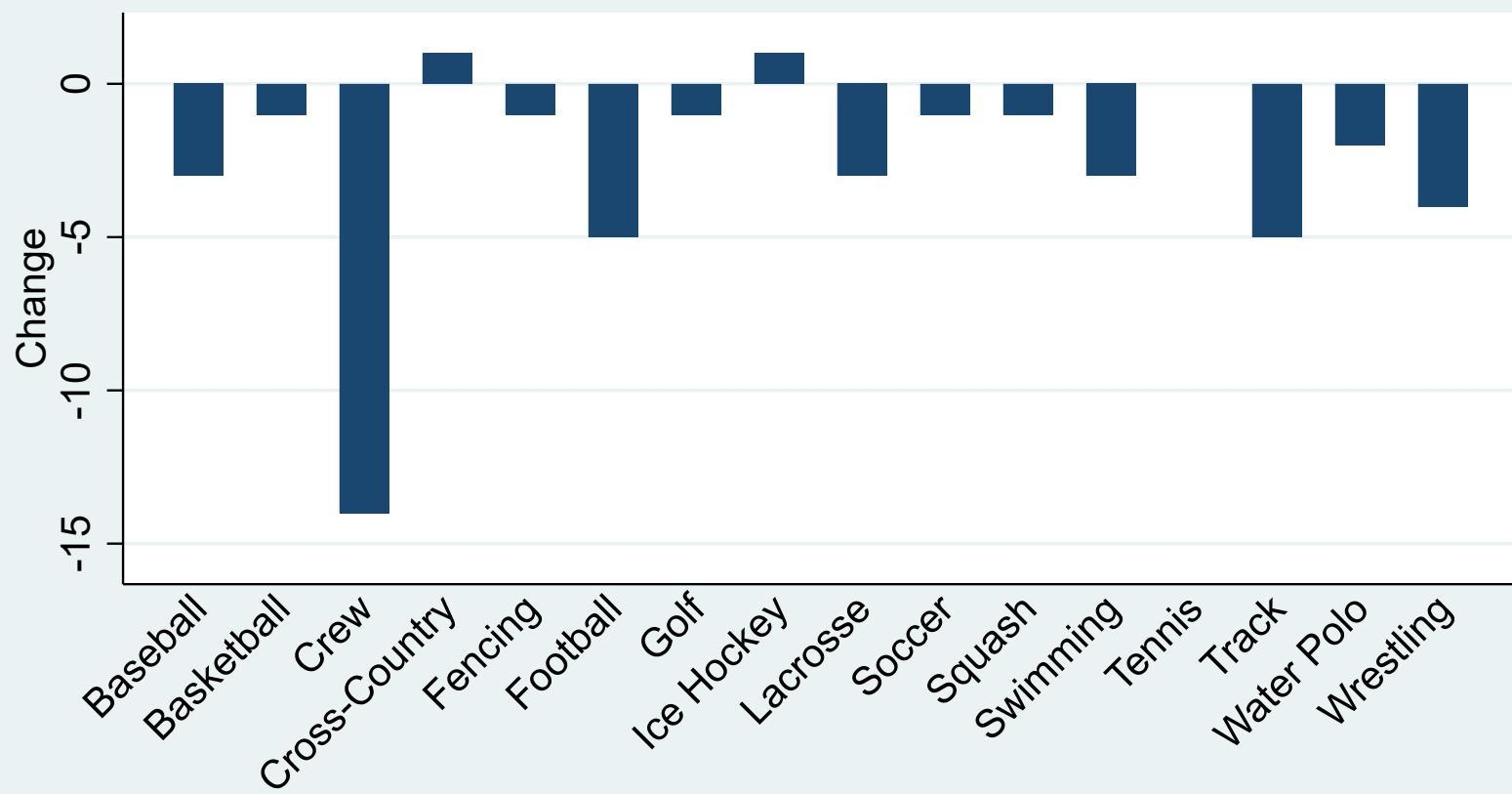
Note: observation level is a team-year combination between 1998-1999 and 2019-2020, excluding 2000-2001. See Notes to Table 3.

Figure 4A  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and First Day of Competition  
2018-2019



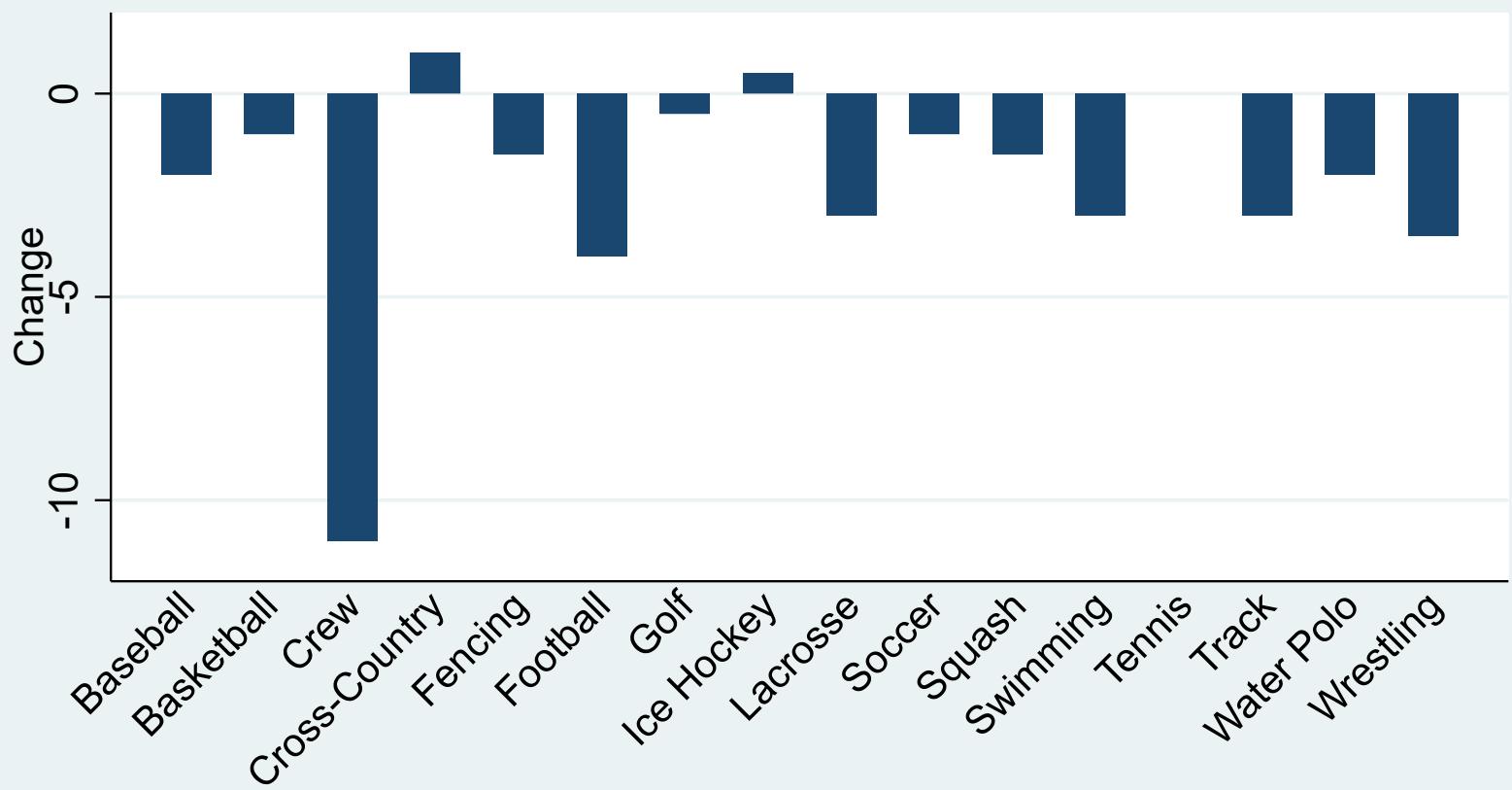
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4B  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and Last Day Competition  
2018-2019



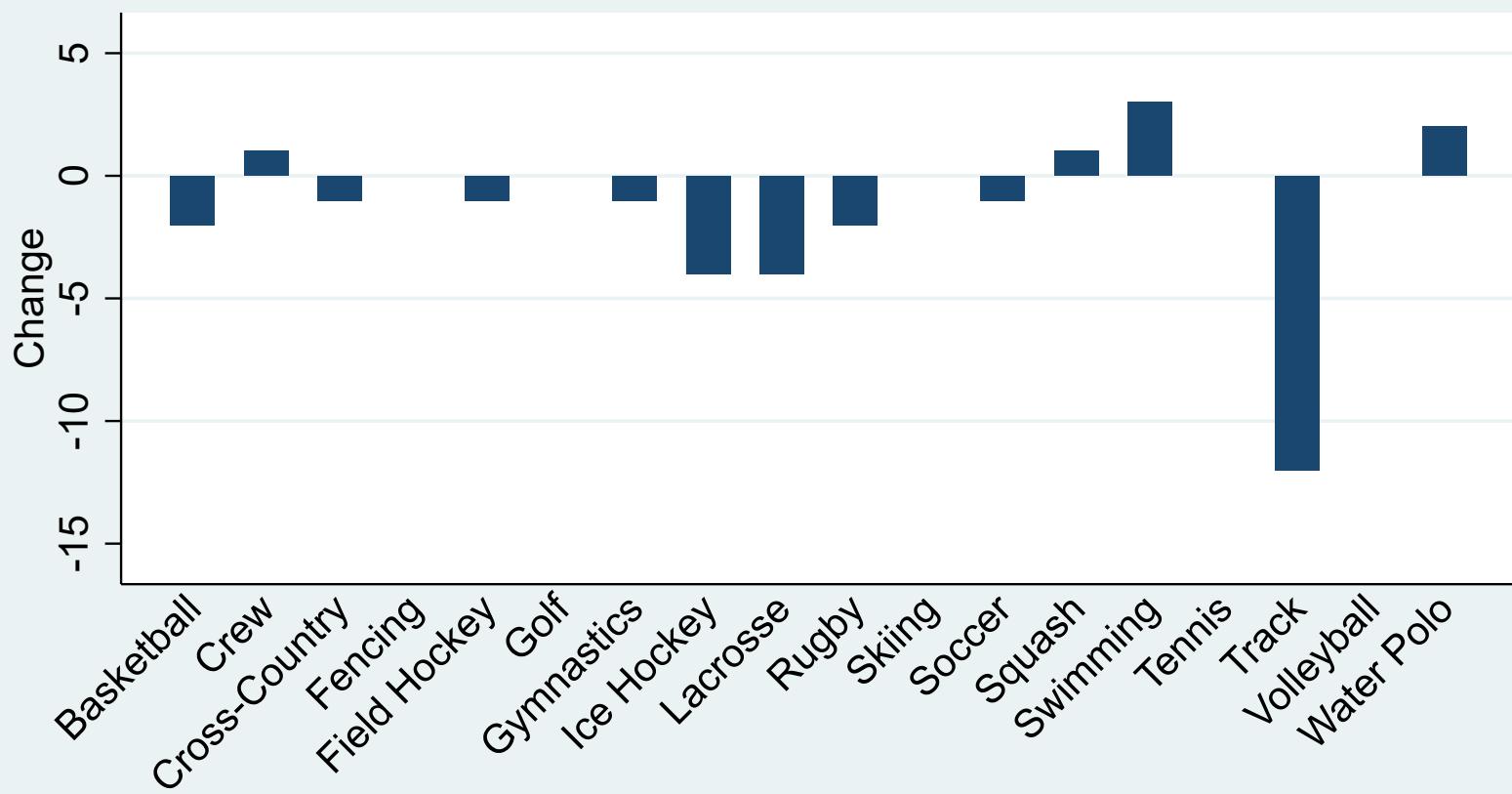
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4C  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and First & Last Competition Average  
2018-2019



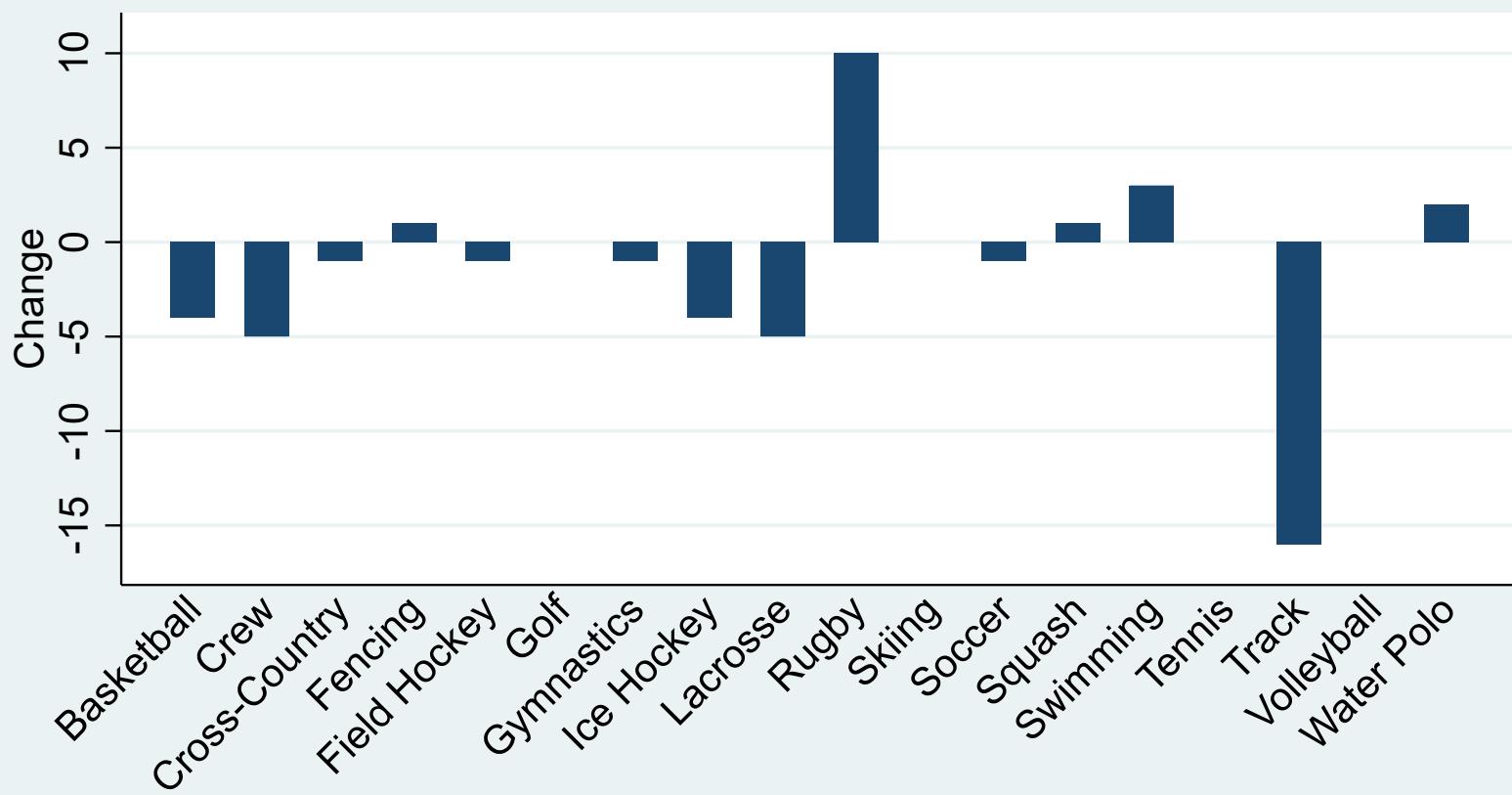
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4D  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and First Day of Competition  
2018-2019



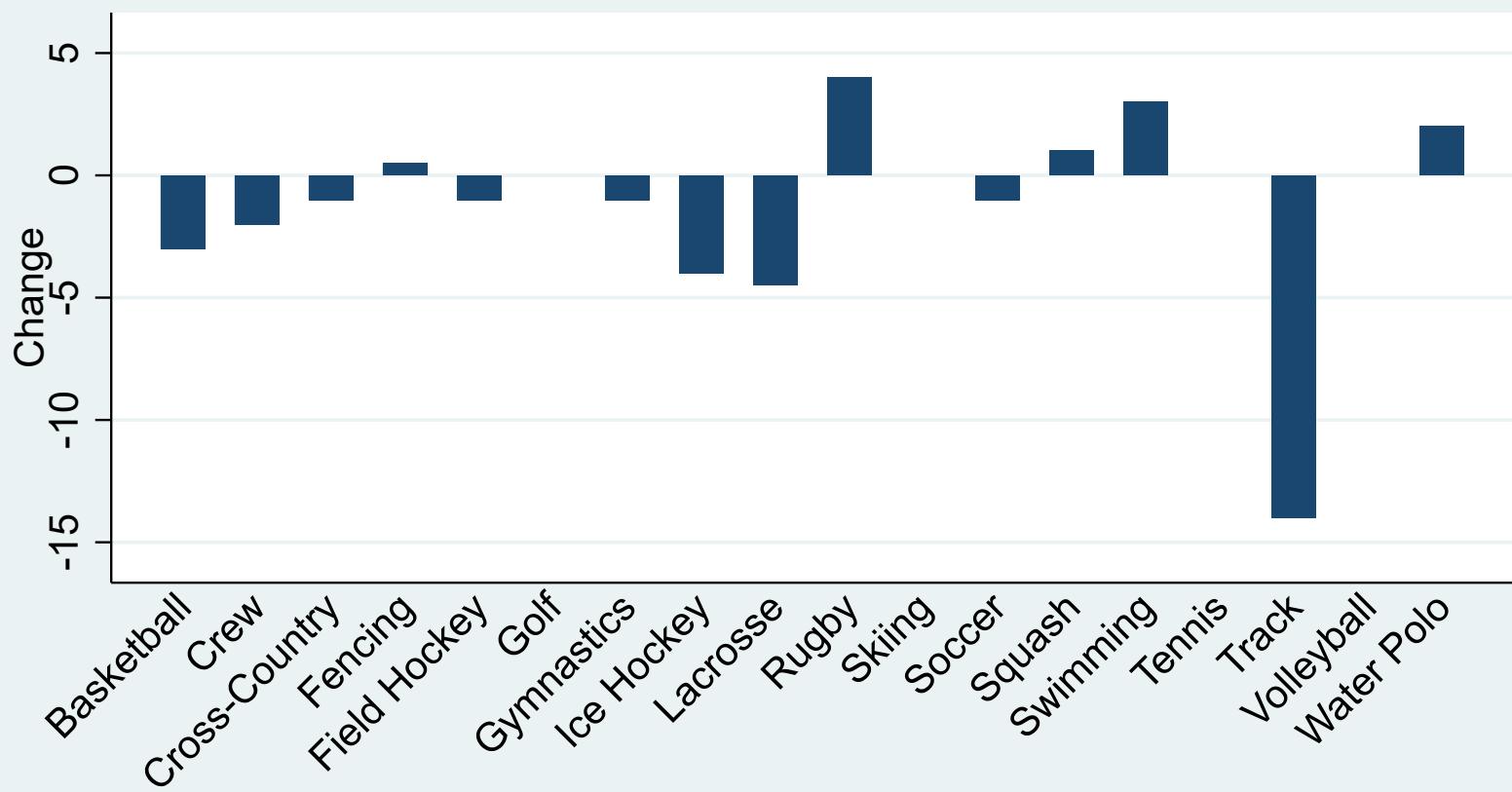
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4E  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and Last Day Competition  
2018-2019



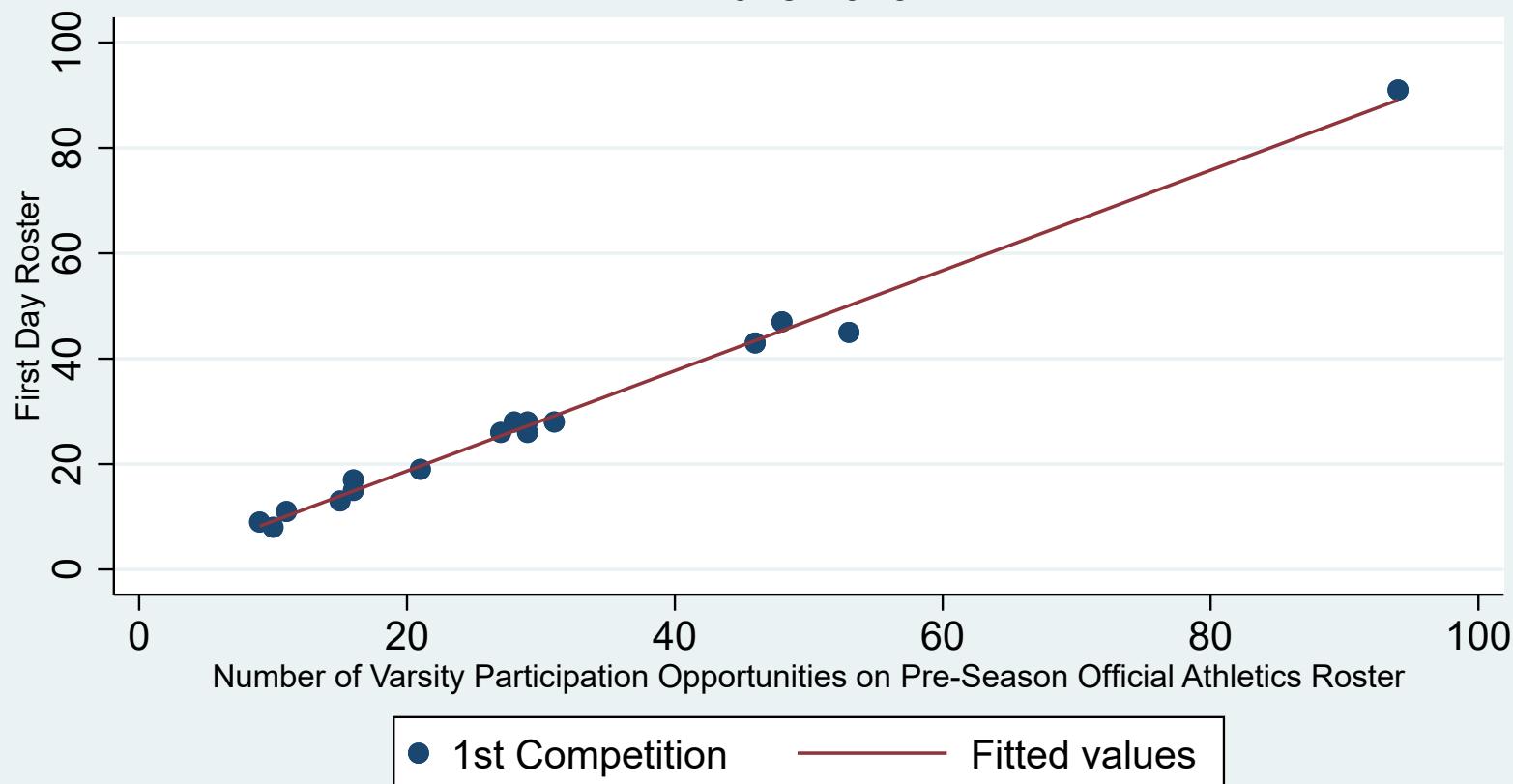
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4F  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and First & Last Competition Average  
2018-2019



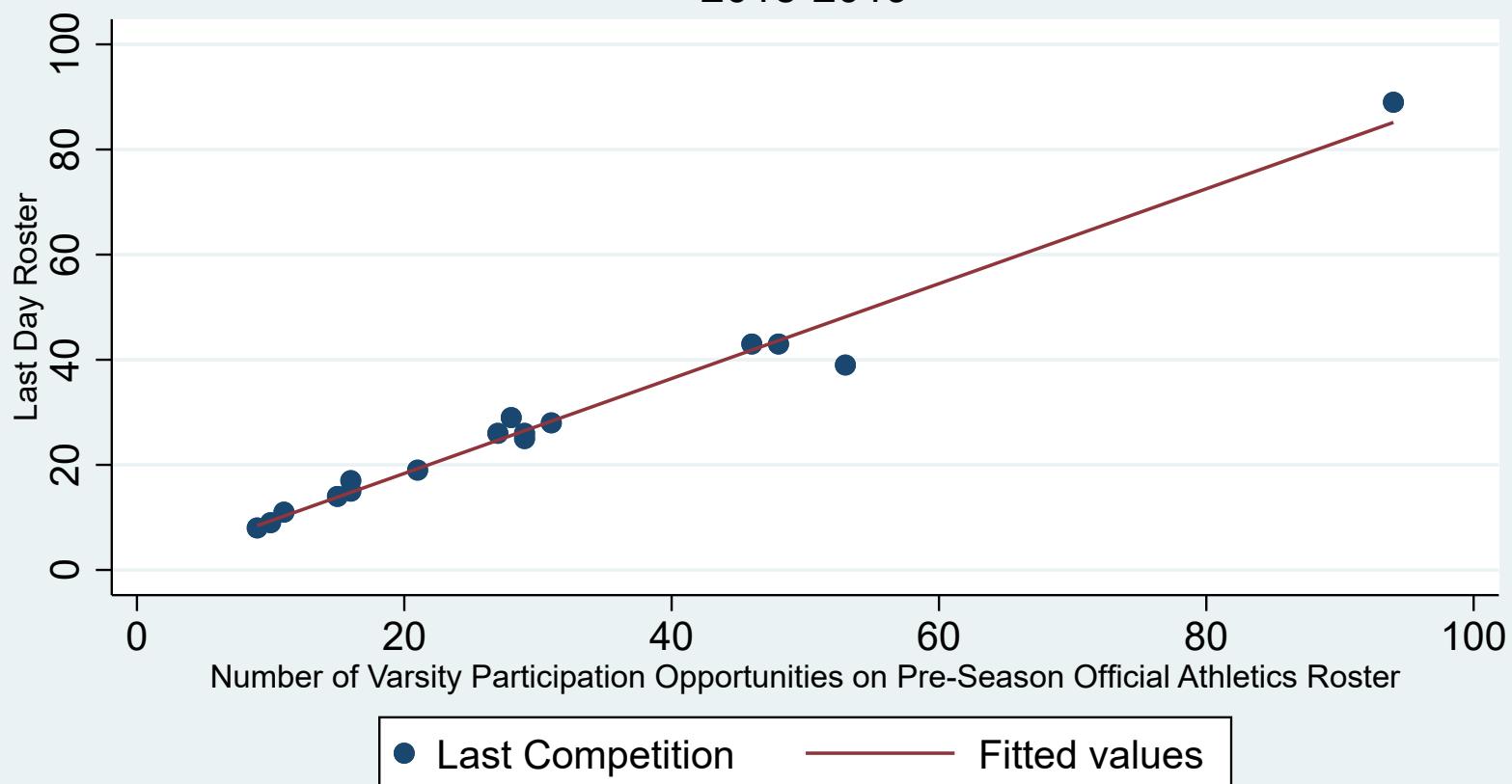
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 4G  
Pre-Season Official Athletics Roster and First Day of Competition  
Men's Roster Size Comparison  
2018-2019



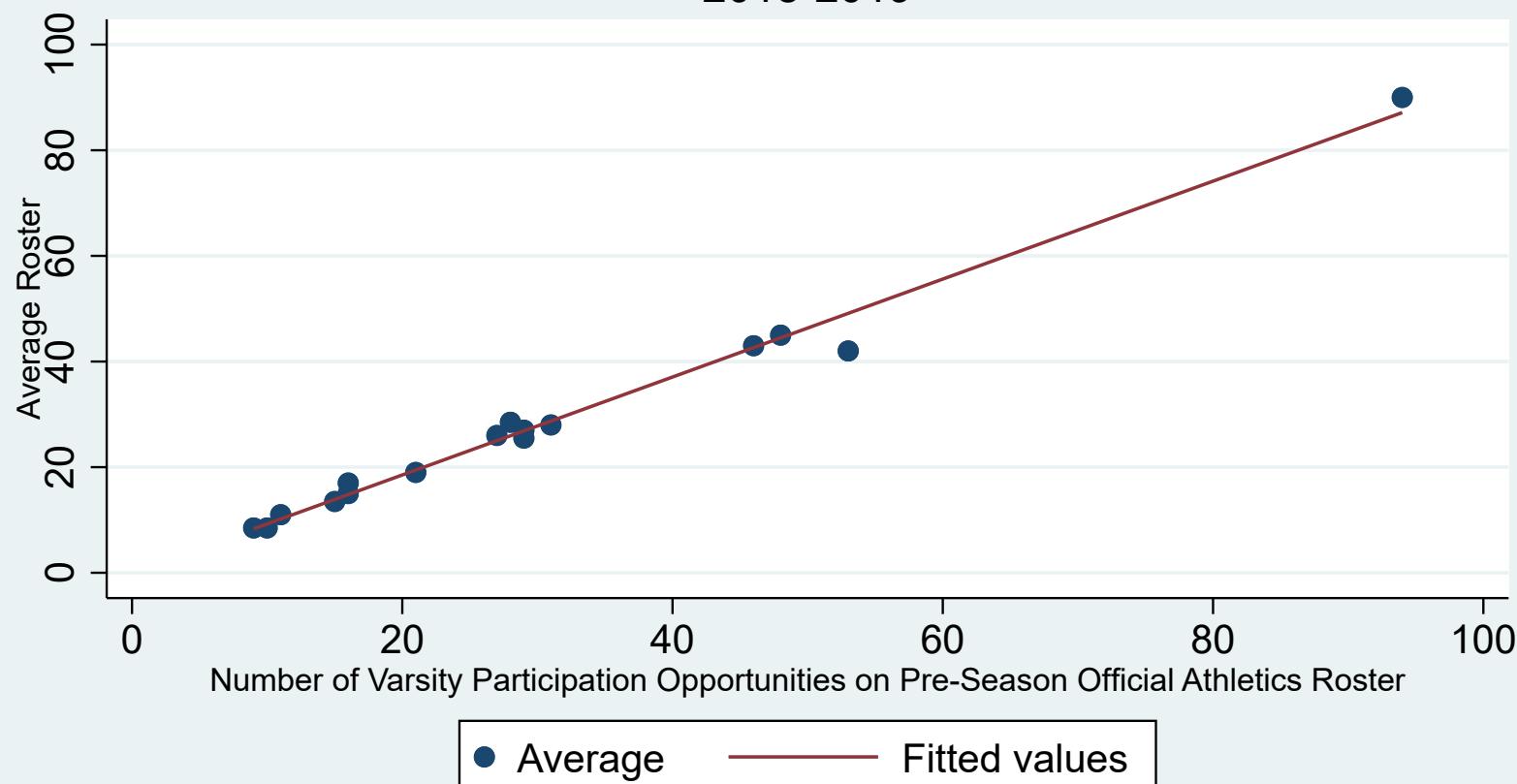
The fitted value line is the result of a regression of first day roster on pre-season roster. The coefficient on pre-season roster size is 0.95. The  $R^2$  of this regression is 0.99.

Figure 4H  
Pre-Season Official Athletics Roster and Last Day Competition  
Men's Roster Size Comparison  
2018-2019



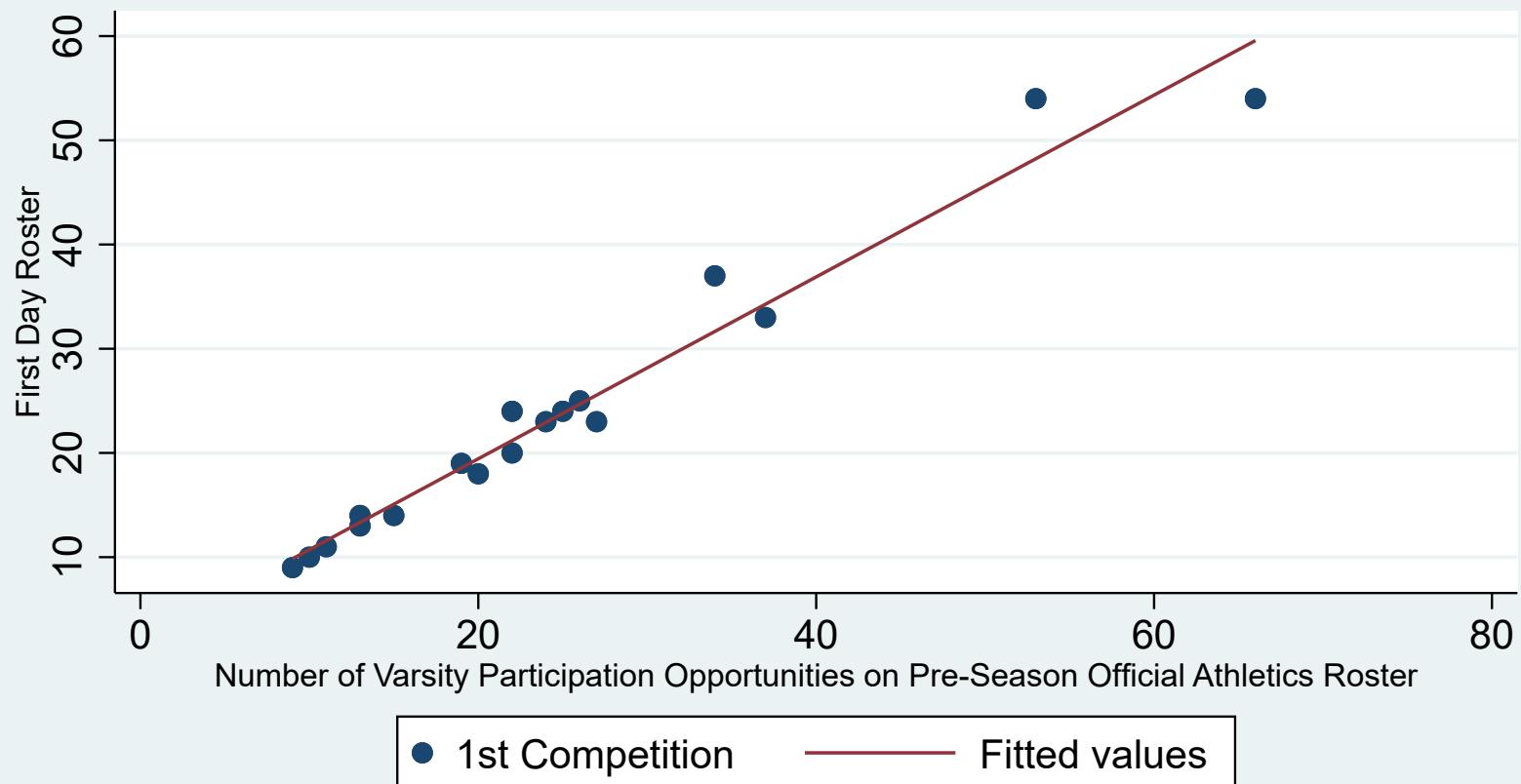
The fitted value line is the result of a regression of last day roster on pre-season roster. The coefficient on pre-season roster size is 0.9. The  $R^2$  of this regression is 0.98.

Figure 4I  
Pre-Season Official Athletics Roster and First & Last Competition Average  
Men's Roster Size Comparison  
2018-2019



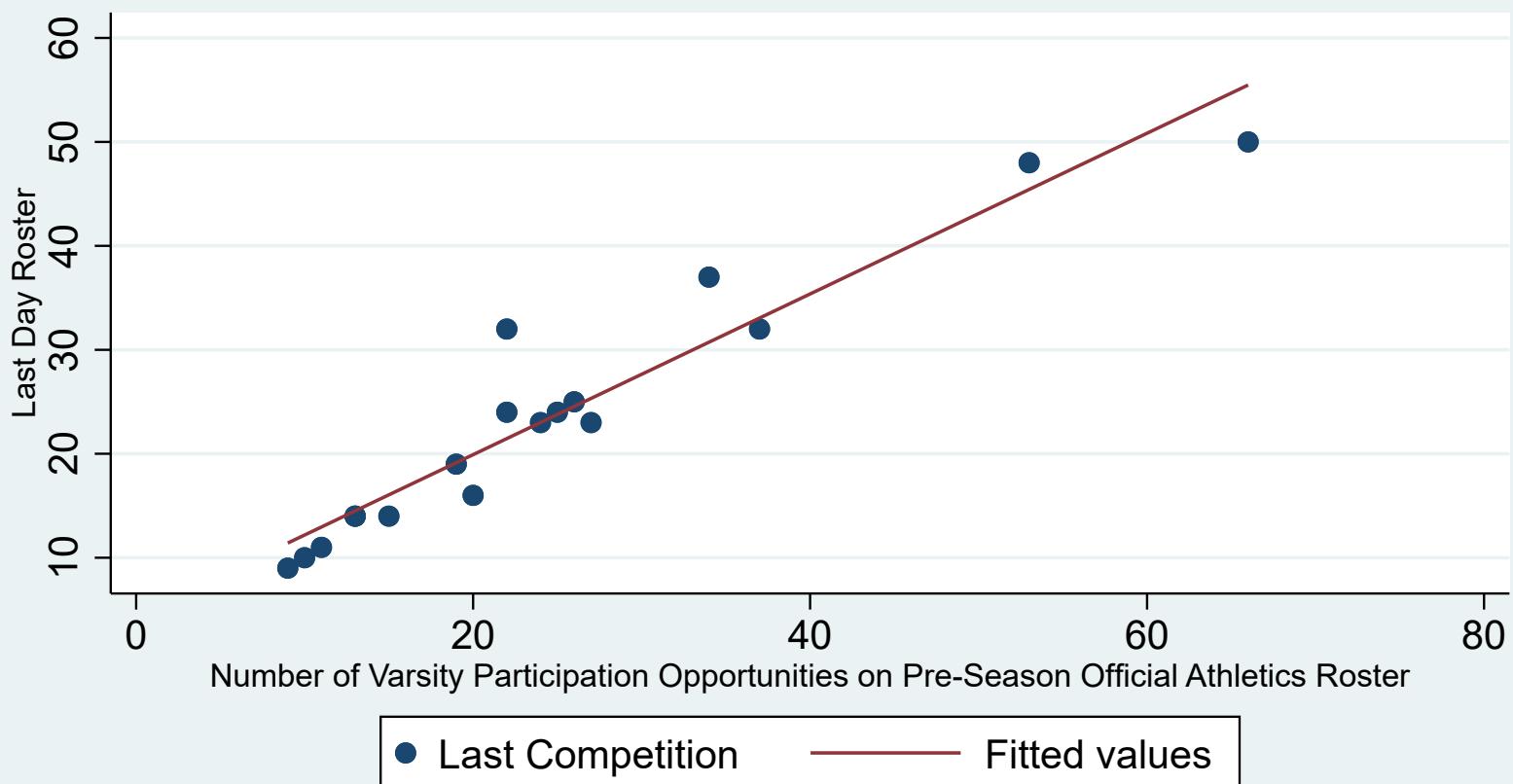
The fitted value line is the result of a regression of average roster on pre-season roster. The coefficient on pre-season roster size is 0.93. The  $R^2$  of this regression is 0.99.

Figure 4J  
Pre-Season Official Athletics Roster and First Day of Competition  
Women's Roster Size Comparison  
2018-2019



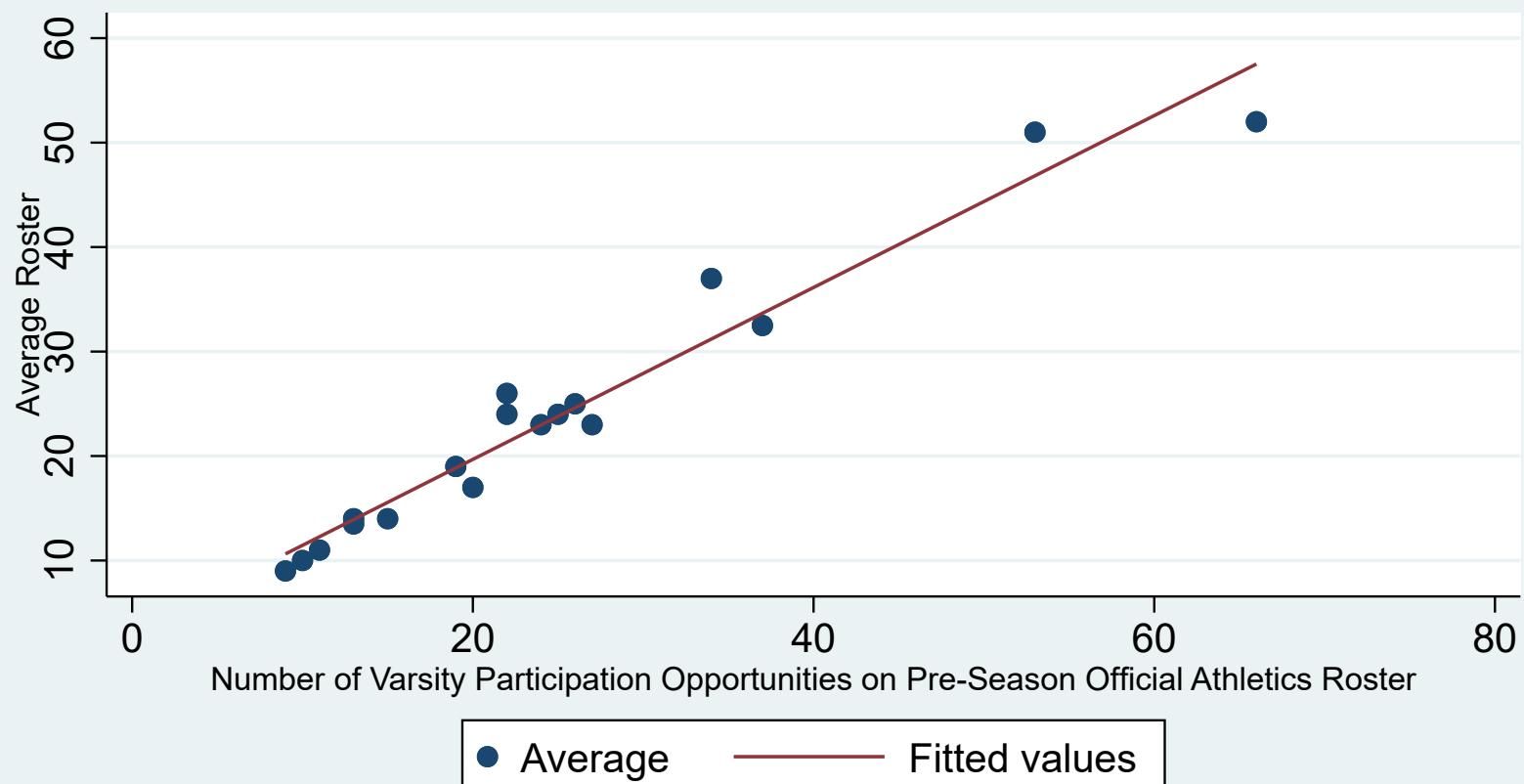
The fitted value line is the result of a regression of first day roster on pre-season roster. The coefficient on pre-season roster size is 0.87. The  $R^2$  of this regression is 0.96.

Figure 4K  
Pre-Season Official Athletics Roster and Last Day Competition  
Women's Roster Size Comparison  
2018-2019



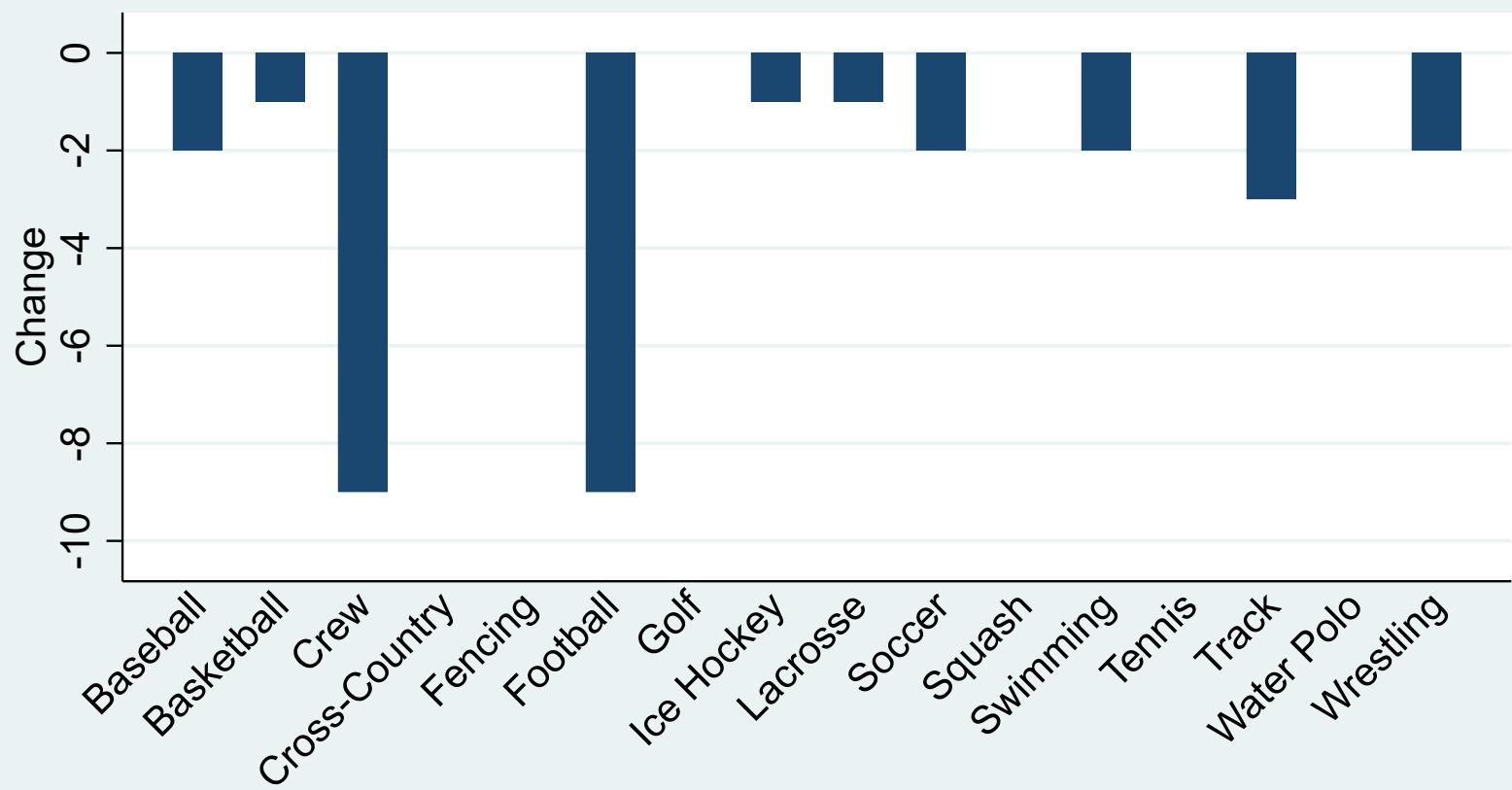
The fitted value line is the result of a regression of last day roster on pre-season roster. The coefficient on pre-season roster size is 0.77. The  $R^2$  of this regression is 0.91.

Figure 4L  
Pre-Season Official Athletics Roster and First & Last Competition Average Women's Roster Size Comparison  
2018-2019



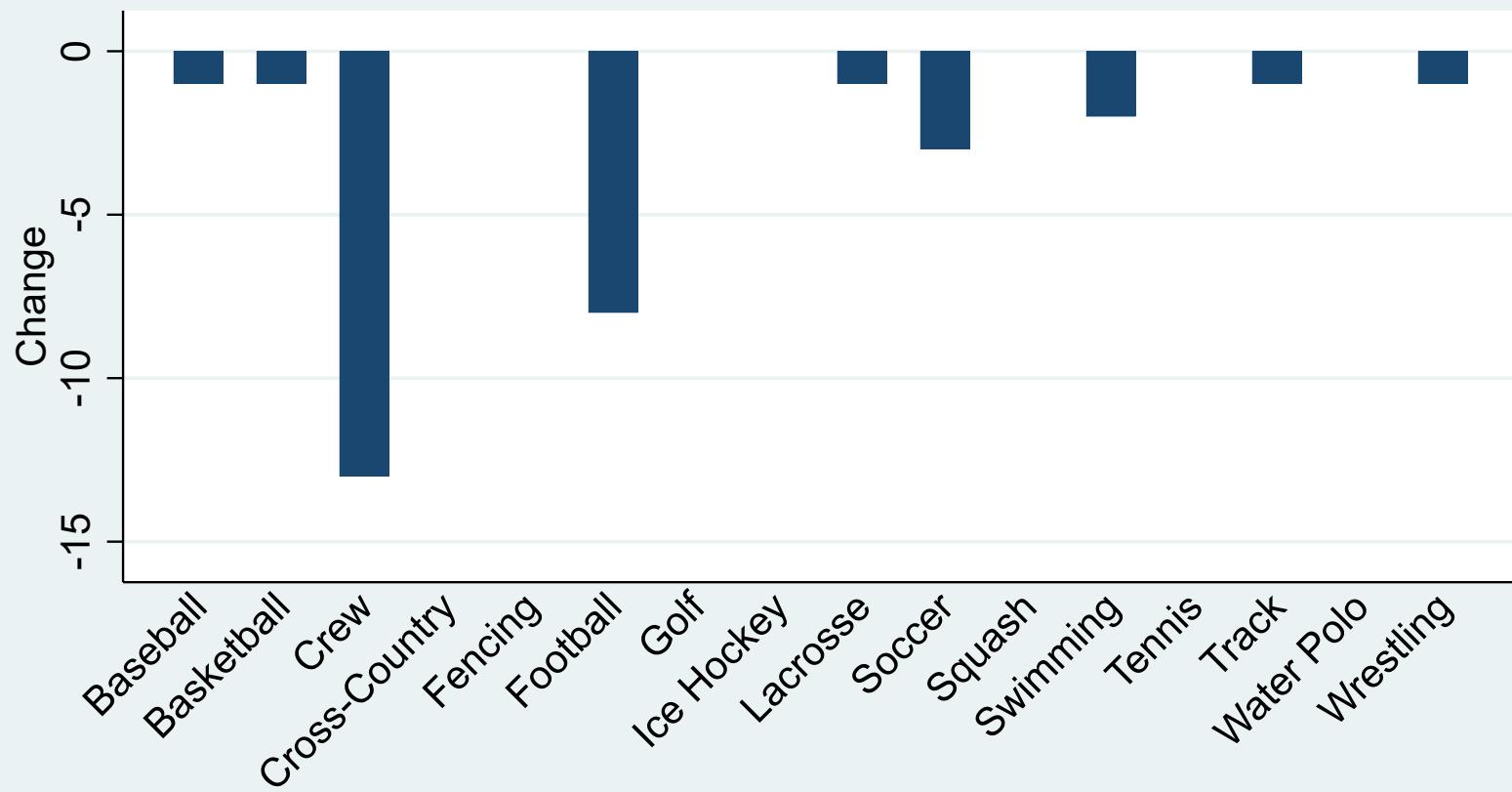
The fitted value line is the result of a regression of average roster on pre-season roster. The coefficient on pre-season roster size is 0.82. The  $R^2$  of this regression is 0.95.

Figure 5A  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and First Day of Competition  
2019-2020



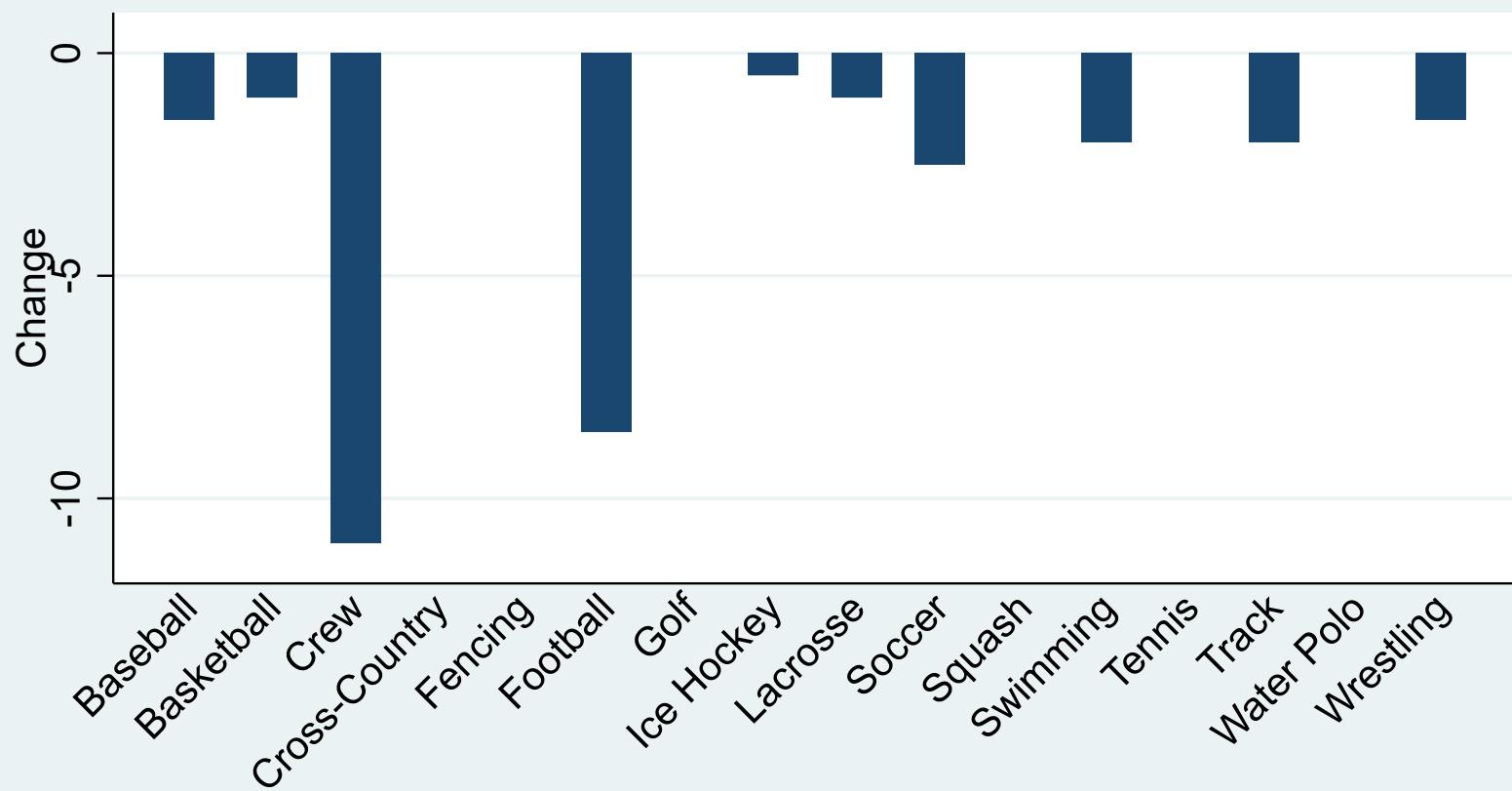
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5B  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and Last Day Competition  
2019-2020



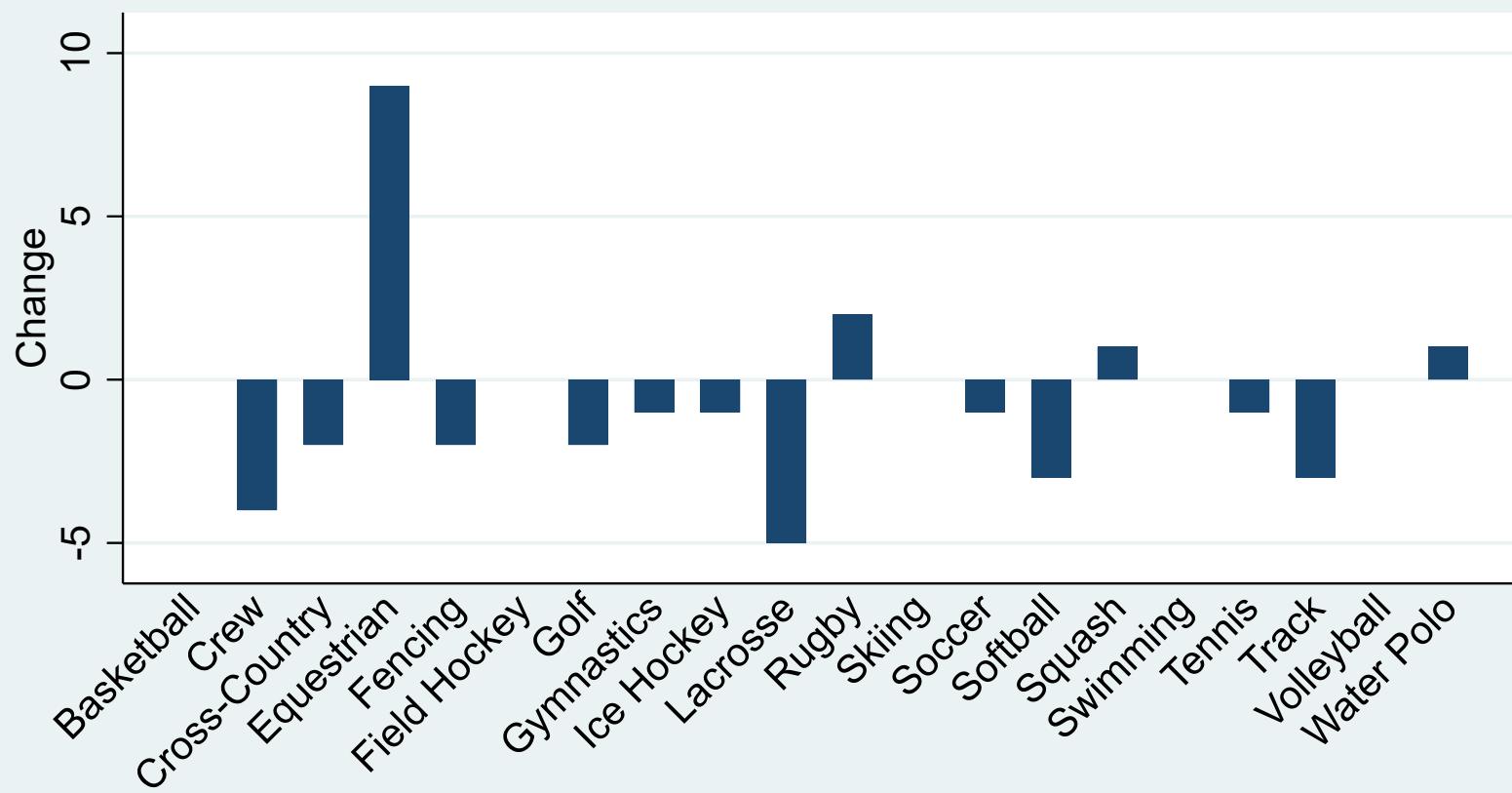
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5C  
Change in Men's Roster Size Between  
Pre-Season Official Athletics Roster and First & Last Competition Average  
2019-2020



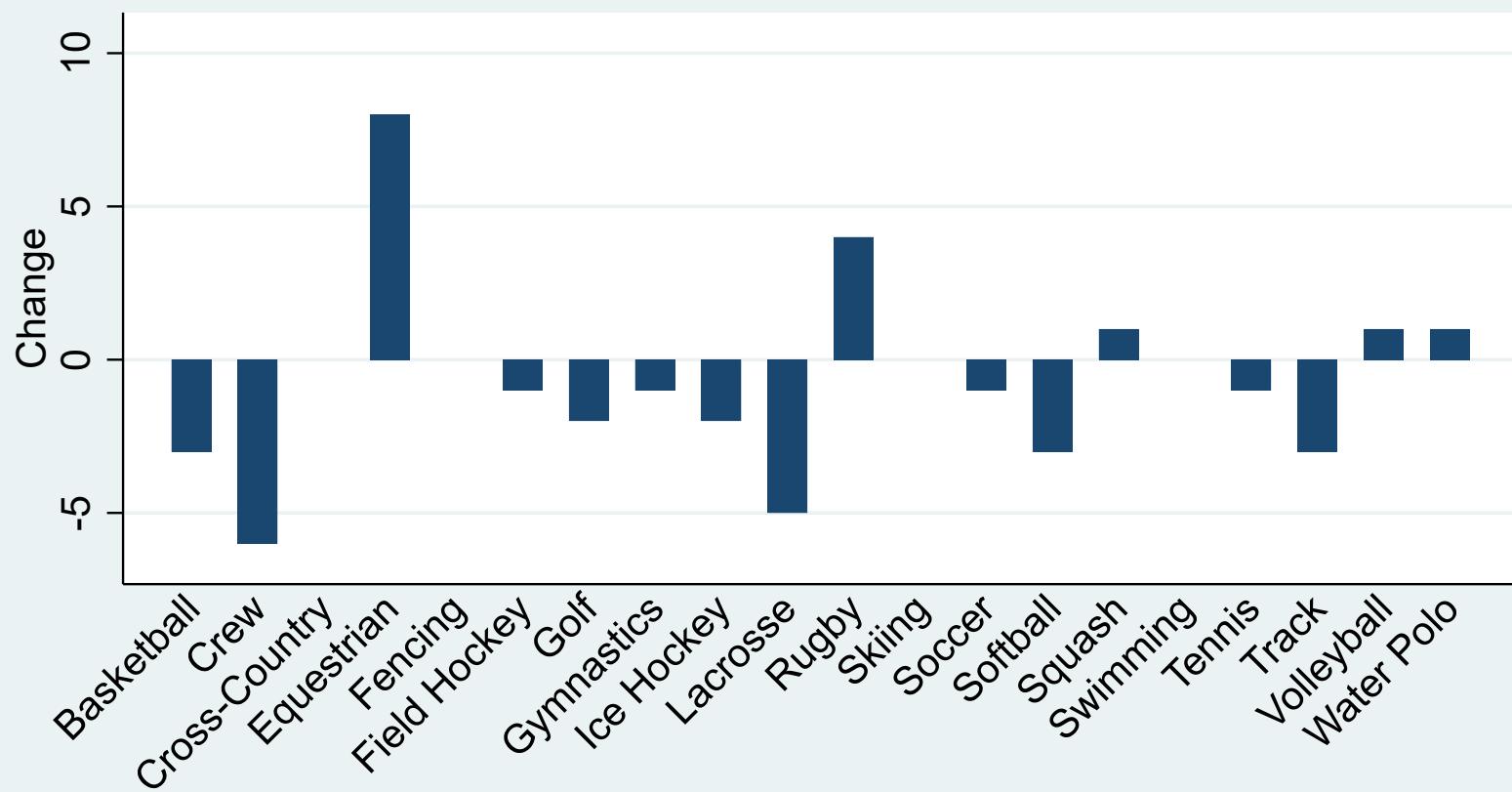
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5D  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and First Day of Competition  
2019-2020



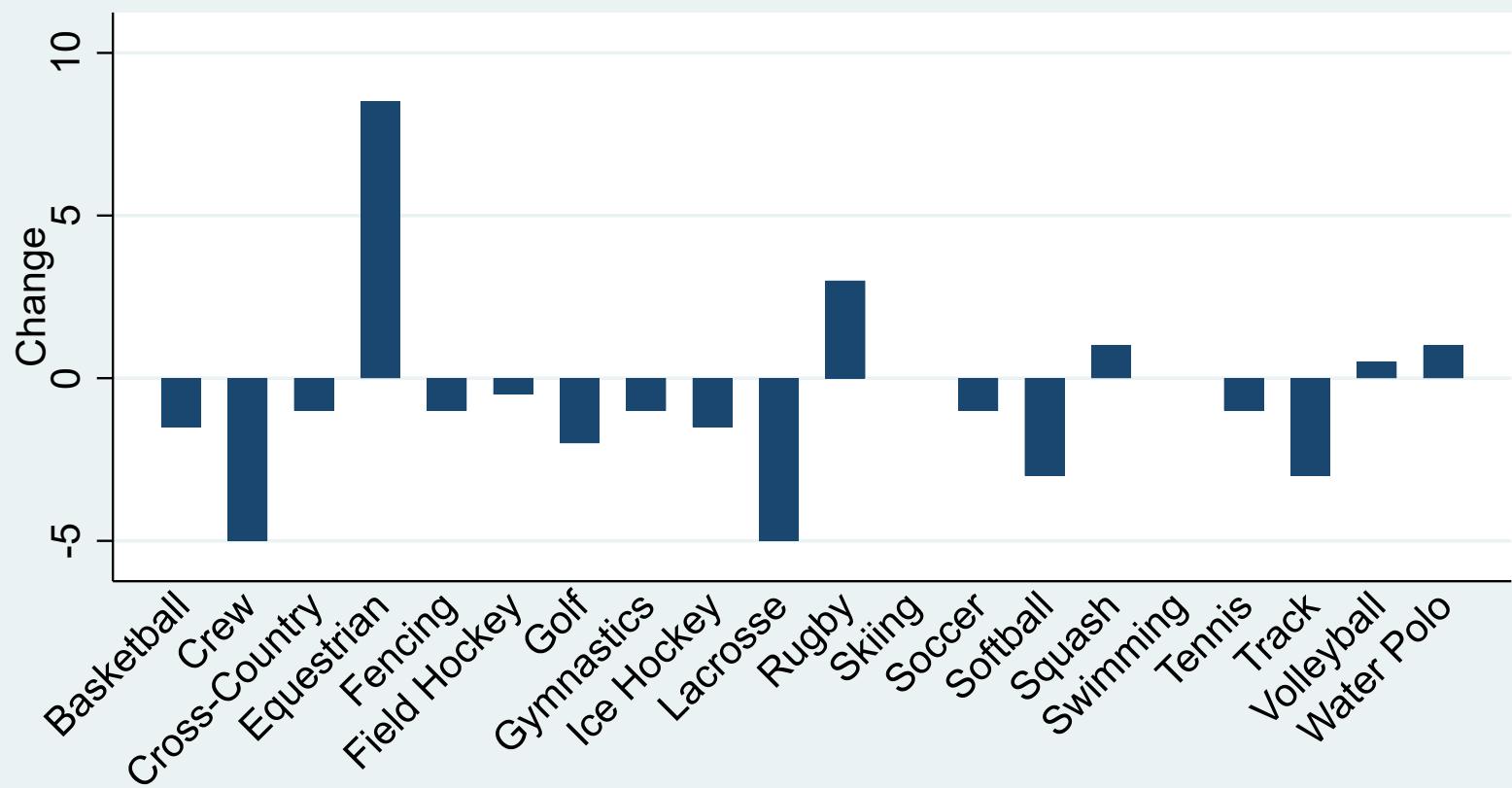
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5E  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and Last Day Competition  
2019-2020



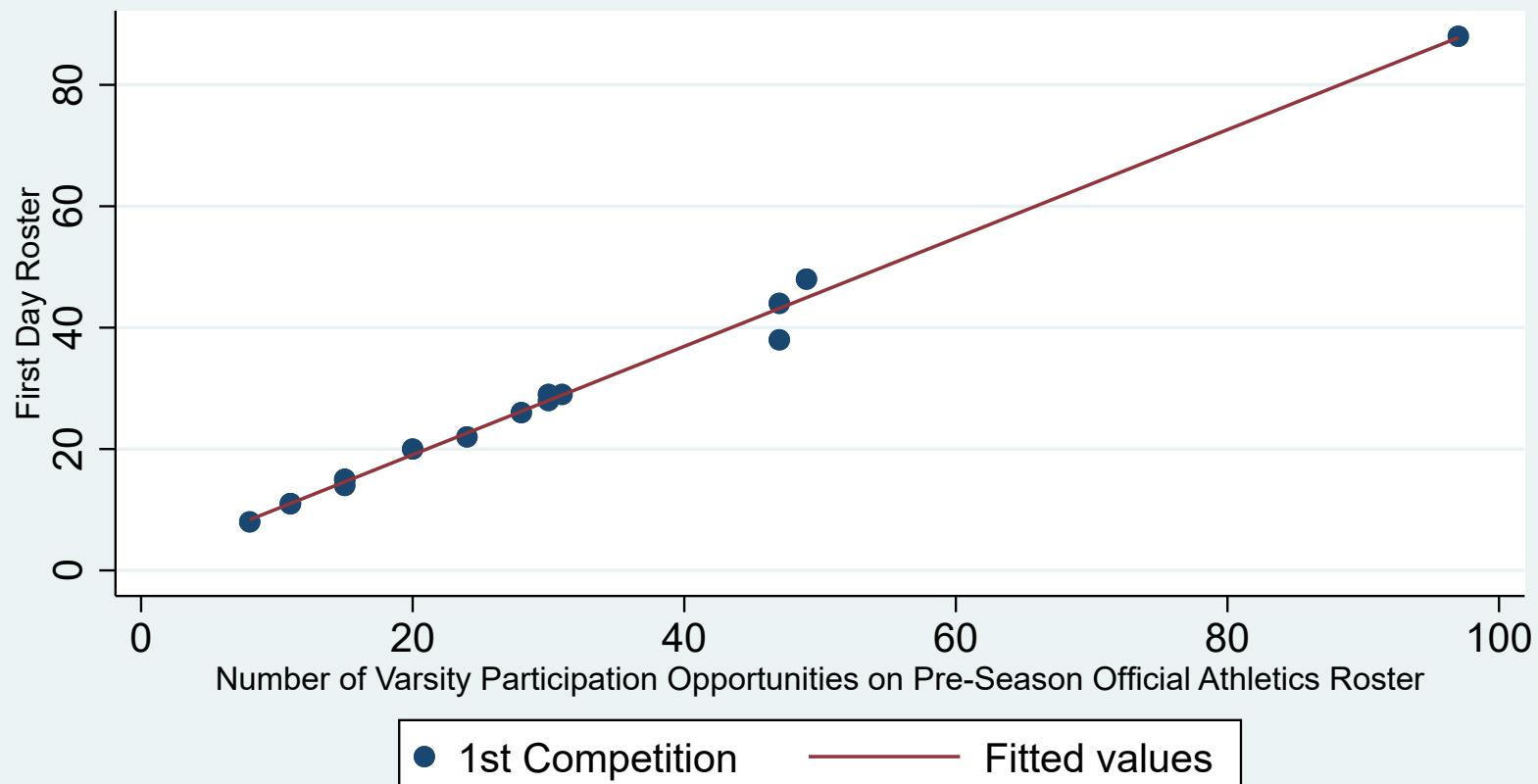
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5F  
Change in Women's Roster Size Between  
Pre-Season Official Athletics Roster and First & Last Competition Average  
2019-2020



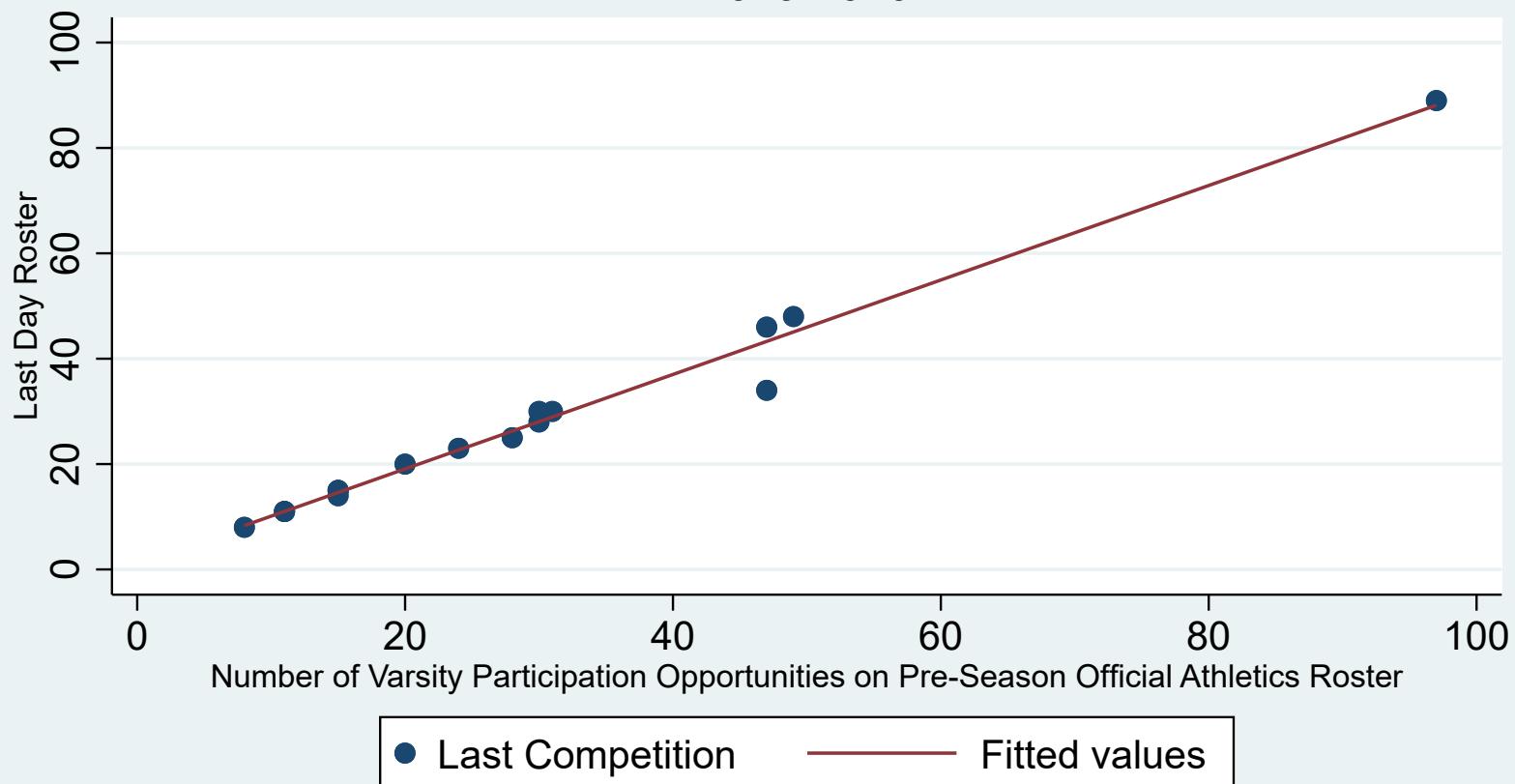
PRIVILEGED AND CONFIDENTIAL: ATTORNEY WORK PRODUCT/ATTORNEY CLIENT COMMUNICATION.  
DRAFT SUBJECT TO CHECKING.

Figure 5G  
Pre-Season Official Athletics Roster and First Day of Competition  
Men's Roster Size Comparison  
2019-2020



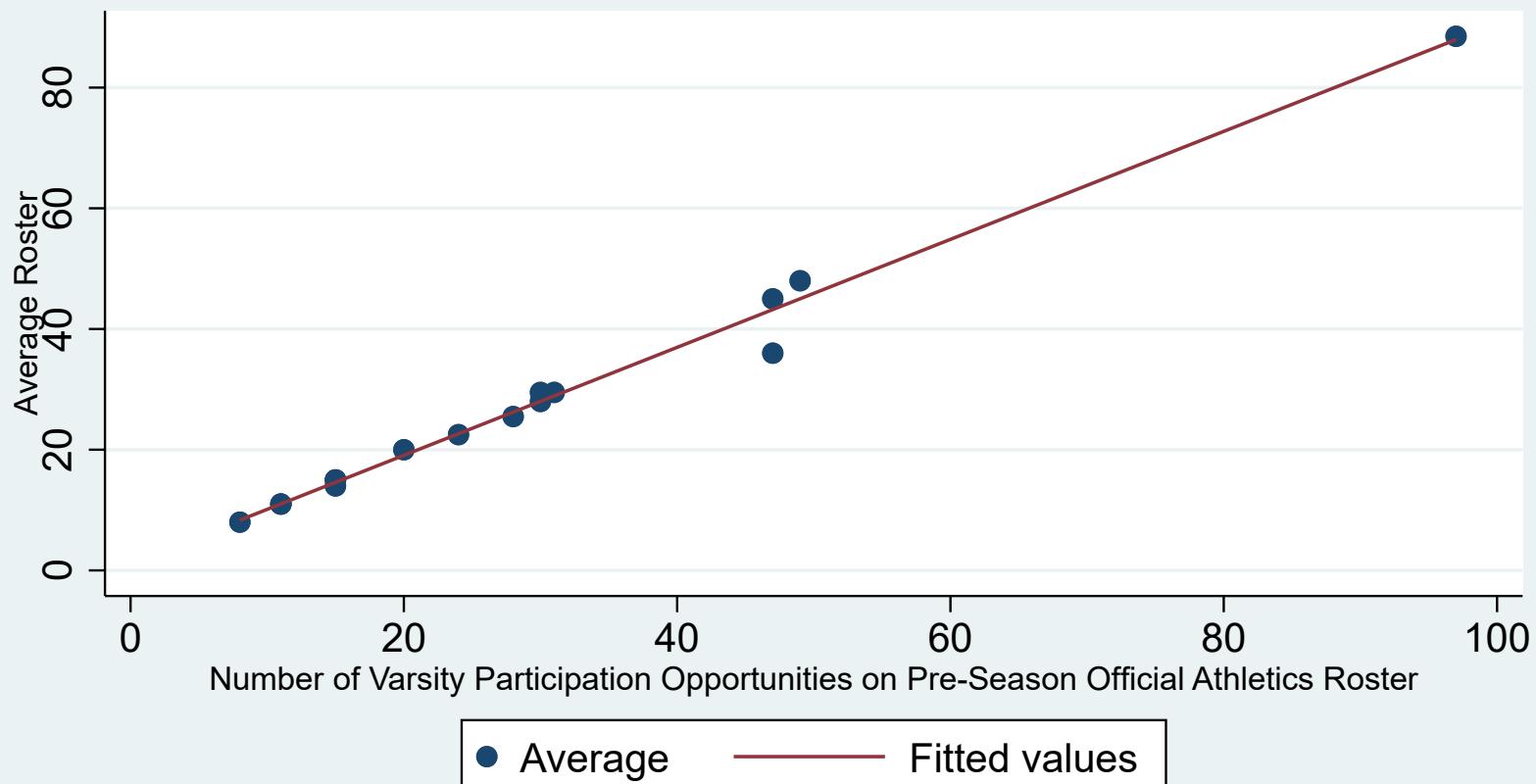
The fitted value line is the result of a regression of first day roster on pre-season roster. The coefficient on pre-season roster size is 0.89. The  $R^2$  of this regression is 0.99.

Figure 5H  
Pre-Season Official Athletics Roster and Last Day Competition  
Men's Roster Size Comparison  
2019-2020



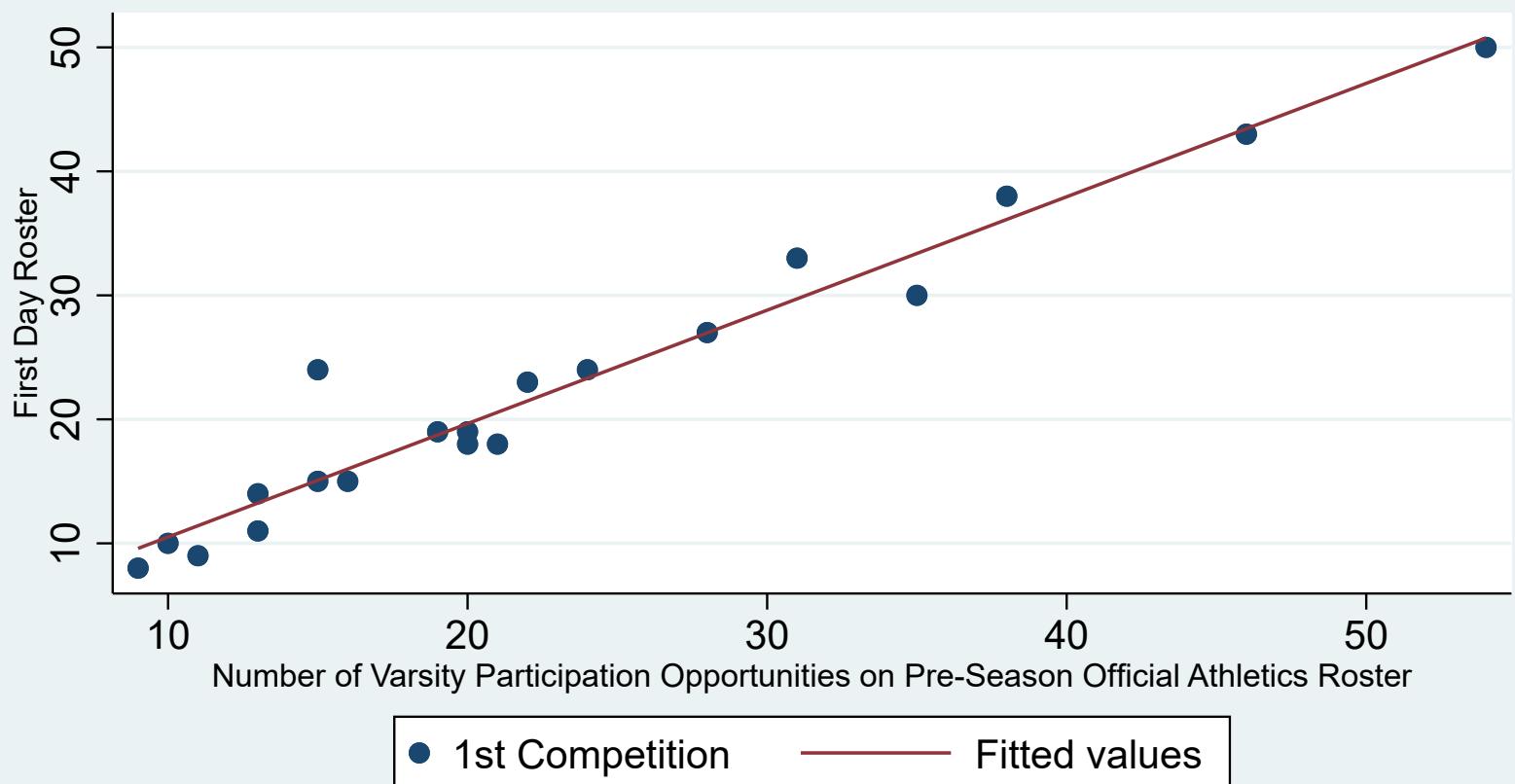
The fitted value line is the result of a regression of last day roster on pre-season roster. The coefficient on pre-season roster size is 0.9. The  $R^2$  of this regression is 0.98.

Figure 5I  
Pre-Season Official Athletics Roster and First & Last Competition Average  
Men's Roster Size Comparison  
2019-2020



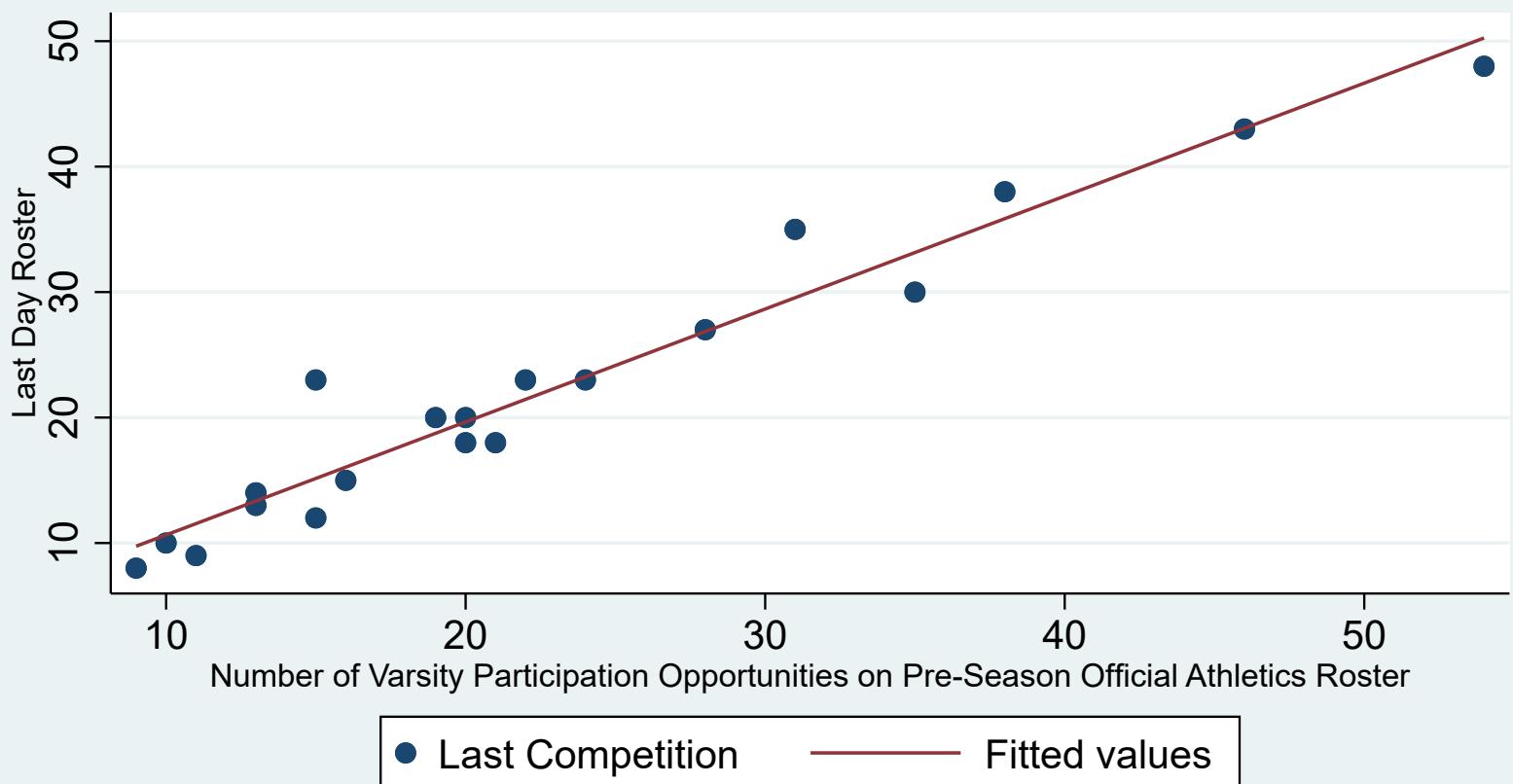
The fitted value line is the result of a regression of average roster on pre-season roster. The coefficient on pre-season roster size is 0.89. The  $R^2$  of this regression is 0.99.

Figure 5J  
Pre-Season Official Athletics Roster and First Day of Competition  
Women's Roster Size Comparison  
2019-2020



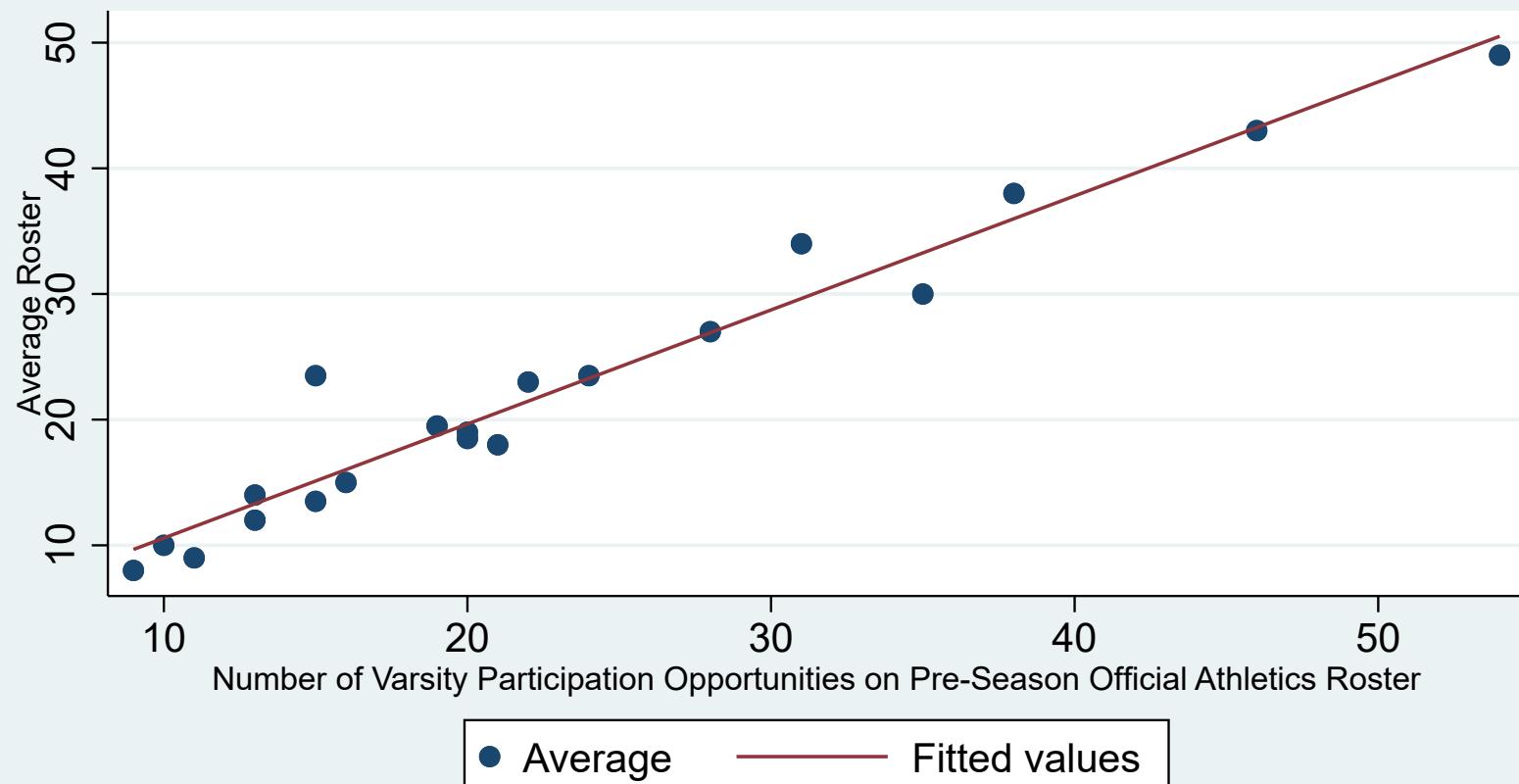
The fitted value line is the result of a regression of first day roster on pre-season roster. The coefficient on pre-season roster size is 0.91. The  $R^2$  of this regression is 0.95.

Figure 5K  
Pre-Season Official Athletics Roster and Last Day Competition  
Women's Roster Size Comparison  
2019-2020



The fitted value line is the result of a regression of last day roster on pre-season roster. The coefficient on pre-season roster size is 0.9. The  $R^2$  of this regression is 0.94.

Figure 5L  
Pre-Season Official Athletics Roster and First & Last Competition Average Women's Roster Size Comparison  
2019-2020



The fitted value line is the result of a regression of average roster on pre-season roster. The coefficient on pre-season roster size is 0.91. The  $R^2$  of this regression is 0.95.

## **Appendix A**

### **Documents Relyed Upon**

In addition to the materials I relied upon in my original report, I have relied upon the following materials:

#### **1998-1999 through 2019-2020 Participation Reports:**

BROWN2020\_00000795 and 796; BROWN2020\_00000966 and 967; BROWN2020\_00001088 and 1089; BROWN2020\_00001251 and 1252; BROWN2020\_00001402 and 1403; BROWN2020\_00001493 and 1494; BROWN2020\_00001640 and 1641; BROWN2020\_00001742 and 1743; BROWN2020\_00001848 and 1849; BROWN2020\_00001960 and 1961; BROWN2020\_00002068 and 2069; BROWN2020\_00002354 and 2355 BROWN2020\_00002533 and 2534; BROWN2020\_00002536 and 2537; BROWN2020\_00002771 and 2772; BROWN2020\_00002892 and 2893; BROWN2020\_00002895 and 2897; BROWN2020\_00003022 and 3023; BROWN2020\_00003620 and 3621; BROWN2020\_00003384 and 3385; BROWN2020\_00003387 and 3388; BROWN2020\_00000081 and 82

#### **2018-2019 Pre-Season Official Athletics Roster:**

BROWN2020\_00003541; BROWN2020\_00003543; BROWN2020\_00003545; BROWN2020\_00003547; BROWN2020\_00003549; BROWN2020\_00003551 and BROWN2020\_00003407; BROWN2020\_00003551 and BROWN2020\_00003409; BROWN2020\_00003553; BROWN2020\_00003555 and -56; BROWN2020\_00003558; BROWN2020\_00003559; BROWN2020\_00003561; BROWN2020\_00003563; BROWN2020\_00003565; BROWN2020\_00003567 and -68; BROWN2020\_00003569 and -70; BROWN2020\_00003572 and -73 ; BROWN2020\_00003575 and -76 ; BROWN2020\_00003578; BROWN2020\_00003579; BROWN2020\_00003581; BROWN2020\_00003583; BROWN2020\_00003584 and -85; BROWN2020\_00003586 and -87; BROWN2020\_00003588; BROWN2020\_00003590; BROWN2020\_00003591; BROWN2020\_00003592; BROWN2020\_00003594; BROWN2020\_00003596; BROWN2020\_00003598; BROWN2020\_00003600; BROWN2020\_00003603; BROWN2020\_00003605 and -06.

#### **2019-2020 Pre-Season Official Athletics Roster:**

BROWN2020\_00000002 and 03; BROWN2020\_00000005; BROWN2020\_00000006; BROWN2020\_00000008; BROWN2020\_00000009; BROWN2020\_00000011; BROWN2020\_00000013; BROWN2020\_00000015; BROWN2020\_00000018; BROWN2020\_00000020 and 23; BROWN2020\_00000024; BROWN2020\_00000026; BROWN2020\_00000027; BROWN2020\_00000030; BROWN2020\_00000032; BROWN2020\_00000034 and 35; BROWN2020\_00000037 and 38; BROWN2020\_00000040 and 41; BROWN2020\_00000042 and 43; BROWN2020\_00000047; BROWN2020\_00000048 and 49; BROWN2020\_00000052; BROWN2020\_00000054; BROWN2020\_00000055; BROWN2020\_00000057; BROWN2020\_00000059; BROWN2020\_00000061 and 62; BROWN2020\_00000063; BROWN2020\_00000065; BROWN2020\_00000067; BROWN2020\_00000069 and 70; BROWN2020\_00000071 and 72; BROWN2020\_00000073; BROWN2020\_00000076; BROWN2020\_00000077 and 78; BROWN2020\_00000080.

**2020-2021 Pre-Season Official Athletics Roster:** BROWN2020\_00000357 and 358; BROWN2020\_00000360; and 361; BROWN2020\_00000363; BROWN2020\_00000366; BROWN2020\_00000369 and 370; BROWN2020\_00000372; BROWN2020\_00000375 and 376; BROWN2020\_00000378 and 379; BROWN2020\_00000381; BROWN2020\_00000384; BROWN2020\_00000387 and 388; BROWN2020\_00000390; BROWN2020\_00000393 and 394; BROWN2020\_00000396 and 397; BROWN2020\_00000399 and 400; BROWN2020\_00000402; BROWN2020\_00000405; BROWN2020\_00000408 and 409; BROWN2020\_00000411 and 412; BROWN2020\_00000414; BROWN2020\_00000417 and 418; BROWN2020\_00000420; BROWN2020\_00000423; BROWN2020\_00000426 and 428; BROWN2020\_00000430; BROWN2020\_00000430 and 431; BROWN2020\_00000433 and 434; BROWN2020\_00000435 and 436; BROWN2020\_00000438 and 439; BROWN2020\_00000441 and 442; BROWN2020\_00000444 and 445; BROWN2020\_00000447 and 448; BROWN2020\_00000790 and 791.

**Additional Bates-Numbered Documents**

BROWN2020\_00003407-3410

BROWN2020\_00003433-3445

BROWN2020\_00000179-183

**Websites**

<https://brownbears.com/sports/equestrian/schedule/2019-20>

<http://www.ncaa.org/championships/statistics>.